

Proceedings of the American Academy of Arts and Sciences

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RECORDS OF MEETINGS, 1936-37

BIOGRAPHICAL NOTICES

OFFICERS AND COMMITTEES FOR 1937-1938

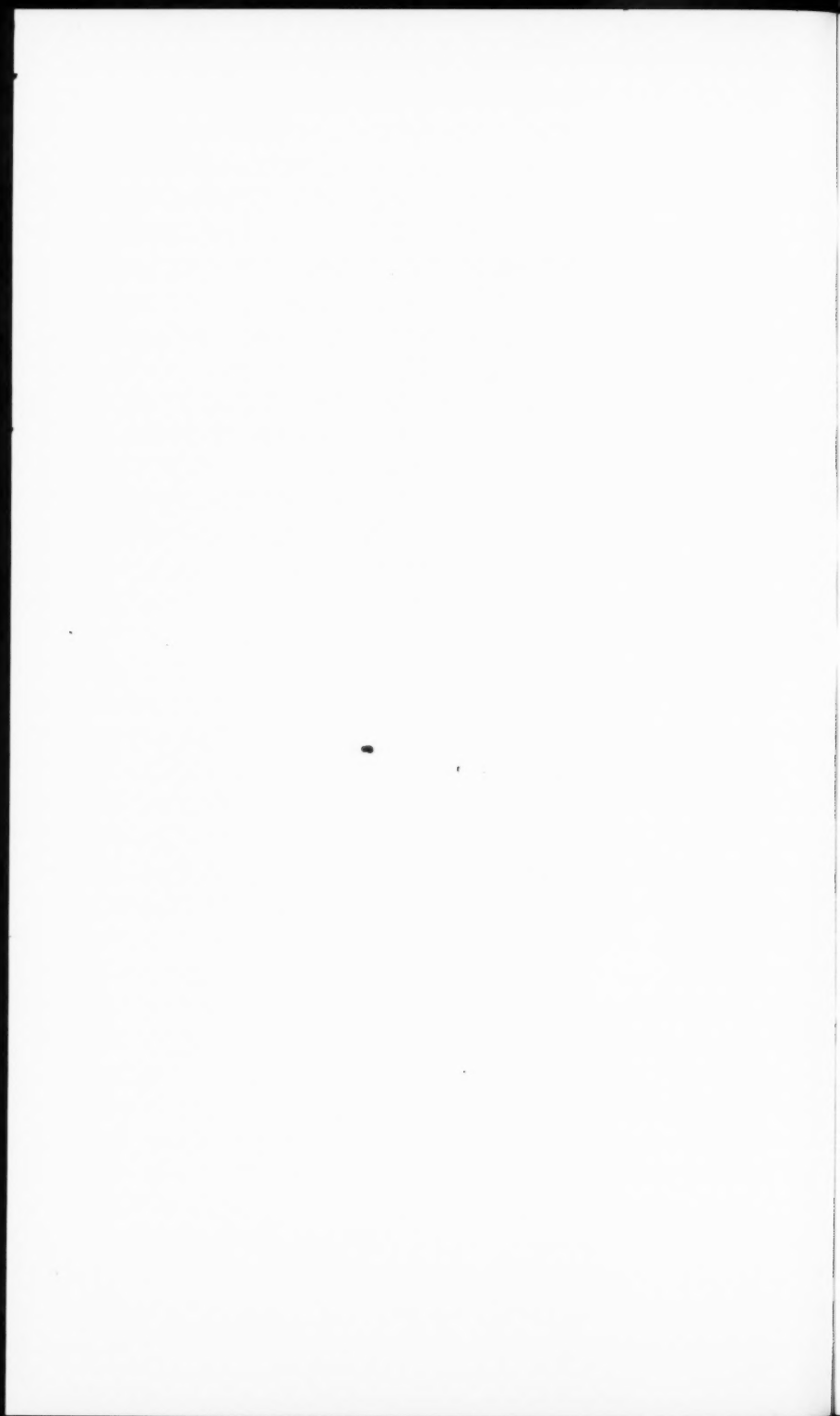
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RECORDS OF MEETINGS

One Thousand Two Hundred and Thirty-Second Meeting

OCTOBER 14, 1936—STATED MEETING

The Academy met at its House at 8.20 P. M.

The PRESIDENT in the Chair.

There were present sixty-eight Fellows and six guests.

The records of the meeting of May 13 were read and approved.

The Corresponding Secretary reported the receipt of letters accepting Fellowship from James Waterhouse Angell, Oswald Theodore Avery, Stoughton Bell, Howard Landis Bevis, Wilfred Bolster, James Cummings Bonbright, Harold Simmons Booth, Claude Raymond Branch, Charles Sidney Burwell, Philip Cabot, Robert Pierce Casey, Edward Hastings Chamberlin, Charles Thornton Davis, Fred Rogers Fairchild, Frank Albert Fetter, Albert Baird Hastings, William Clifford Heilman, Frederick Lee Hisaw, Murray Philip Horwood, Ernest Hamlin Huntress, Morris Bryan Lambie, Roswell Cheney McCrea, Malcolm Perrine McNair, Dumas Malone, Elton Mayo, Avery Adrian Morton, Philip Stanley Parker, Henry Parkman, Jr., Stanley Elroy Qua, Thomas Henry Sanders, Donald Scott, Sidney Post Simpson, Clair Elsmere Turner, Joseph Henry Willits; and of letters accepting Foreign Honorary Membership from Edward Victor Appleton, Miguel Asín y Palacios, Marcel Aubert, Raoul Blanchard, Paul Kretschmer, and Jean Hyacinthe Vincent.

He also reported the receipt of letters resigning Fellowship from Harry Ellsworth Clifford (Class I, Section 4) and Henry Richardson Shepley (Class IV, Section 4).

The Corresponding Secretary announced that the Council had appointed George Grafton Wilson Vice-President for Class III for the unexpired term of Edwin Francis Gay, who had become a non-resident Fellow and had therefore resigned the Vice-Presidency.

He also reported that the second Wednesday of November being a holiday, November 11, Armistice Day, the Council had voted that the November 1936 meeting of the Academy be held on November 18.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To Professor James A. Beattie, Massachusetts Institute of Technology, Cambridge, \$500, to provide a technical assistant to enable him to make the necessary computations in the evaluation of certain thermodynamic data obtained in an investigation of pressure effects on various thermometric scales.
2. To Professor Elery R. Becker, Iowa State College, Ames, \$500, for expenses connected with an investigation of the effects of food constituents on coccidians.
3. To Professor Robley D. Evans, Massachusetts Institute of Technology, Cambridge, \$500, for the purpose of purchasing apparatus to be used in his study of radium poisoning.
4. To Professor J. Horace Faull, Arnold Arboretum, Jamaica Plain, Mass., \$300, to aid him in making a trip to Guatemala and other southern countries to enable him to collect material on rusts that alternate between coniferous, angiospermous, and filicinean hosts.
5. To Dr. Millard F. Manning, University of the City of Toledo, Toledo, Ohio, \$125, toward the purchase of a computing machine to be used in making theoretical calculations of the electronic energy bands in metals.
6. To Professor R. K. Nabours, Kansas State College of Agriculture, Manhattan, \$350, to help defray his expenses in collecting specimens of grouse locusts (*Tetriginae*) in the regions around Tampico and Vera Cruz, Mexico.
7. To Professor Alden E. Noble, College of the Pacific, Stockton, Cal., \$312, for technical assistance in the preparation of microscope slides and for work connected with studies on the trematode fauna of the marine fishes of Monterey Bay, Cal.
8. To Professor Thomas L. Smith, College of the Ozarks, Clarksville, Arkansas, \$100, to be used in continuing his studies of induced mutations in the wax moth, *Galleria mellonella*.
9. To Professor William F. Windle, Northwestern University Medical School, Chicago, Ill., \$500, to aid him in employing a technician in his study of the development of foetal behavior as correlated with intrinsic growth of the nervous system.

The President announced the death of six Fellows: Charles Thornton Davis (Class III, Section 1), John Hays Hammond (Class I, Section 4), Harry Wheeler Morse (Class I, Section 2), Arthur Amos Noyes (Class I, Section 3), Percy Goldthwait Stiles (Class II, Section 3), Francis Henry Williams (Class II, Section 4); and of three Foreign Honorary Members: Henri Louis LeChatelier (Class I, Section 3), Antoine Meillet (Class IV, Section 3), Sir Arnold Theiler (Class II, Section 4).

The Fellows elected in May were then presented to the Academy.

The following communication was presented:

Mr. Arthur D. Nock: "The Genius of Mithraism."

The following papers were read by title:

"Ecological Relations of Ponerine and other Ants to Termites," by William M. Wheeler; "Uncertain Inference," by Ronald A. Fisher; "The Respiratory Metabolism of the Chimpanzee," by John M. Bruhn and Francis G. Benedict; "Insects and Arachnids from Canadian Amber," by F. M. Carpenter and C. T. Brues; "Shearing Phenomena at High Pressure, particularly in Inorganic Compounds," by P. W. Bridgman.

The meeting was dissolved at 9.15 P. M.

One Thousand Two Hundred and Thirty-Third Meeting

NOVEMBER 18, 1936—STATED MEETING

The Academy met at its House at 8.15 P. M.

The PRESIDENT in the chair.

There were present forty-six Fellows, one Foreign Honorary Member, Professor D'Arcy Wentworth Thompson, and four guests.

The records of the meeting of October 14 were read and approved.

The Corresponding Secretary reported the receipt of letters resigning Fellowship from Truman L. Kelley and Francis P. Magoun, Jr.

He also announced that the Council had reappointed Mr. F. N. Robinson for four years as a delegate from the Academy to the American Council of Learned Societies.

The President announced the death of one Fellow, Frank Arthur Laws (Class I, Section 2); and two Foreign Honorary Members: Joseph Redlich (Class III, Section 1) and Charles Sanford Terry (Class IV, Section 2).

The following communication was presented:

Mr. Donald H. Menzel and Mr. Joseph C. Boyce: "The Harvard-Massachusetts Institute of Technology Eclipse Expedition to Siberia," illustrated with lantern slides.

The meeting was dissolved at 9.25 P. M.

One Thousand Two Hundred and Thirty-Fourth Meeting

DECEMBER 9, 1936—STATED MEETING

The Academy met at its House at 8.15 P. M.

The PRESIDENT in the Chair.

There were present forty-three Fellows and one guest.

The records of the meeting of November 18 were read and approved.

The following communication was presented:

Dr. Fred B. Lund: "The Many-Sided Galen."

The following papers were ready by title: "An Experimental Study of the Absolute Temperature Scale," by James A. Beattie, in three parts; "Polymorphic Transitions of 35 Substances to 50,000 Kilograms per Square Centimeter," by P. W. Bridgman.

The meeting was dissolved at 9.25 P. M.

One Thousand Two Hundred and Thirty-Fifth Meeting

JANUARY 13, 1937—STATED MEETING

The Academy met at its House at 8.25 P. M.

The PRESIDENT in the Chair.

There were present twenty-five Fellows.

The records of the meeting of December 9 were read and approved.

The President announced the death of three Fellows: Oliver Lanard Fassig (Class II, Section 1), Francis Greenwood Peabody (Class IV, Section 1), and Julius Oscar Stieglitz (Class I, Section 3).

The following communication was presented:

Mr. Nathan Isaacs: "Political, Legal, and Economic Logic—and Logic."

The meeting was dissolved at 9.20 P. M.

One Thousand Two Hundred and Thirty-Sixth Meeting

FEBRUARY 10, 1937—STATED MEETING

The Academy met at its House at 8.17 P. M.

The Senior Vice-President, Dr. Walter B. Cannon, in the Chair.

There were present fifty-six Fellows and ten guests.

The records of the meeting of January 13 were read and approved.

The Corresponding Secretary reported the receipt of letters resigning Fellowship from Frederick S. Converse and Alpheus G. Woodman.

The Presiding Officer announced the death of Elihu Root, Fellow in Class III, Section 1, and of Sir Frederick Pollock, Bart., Foreign Honorary Member in Class III, Section 1.

The following communication was presented:

Mr. Charles F. Brooks: "Weather Forecasting," illustrated with lantern slides.

The meeting was dissolved at 9.55 P. M.

One Thousand Two Hundred and Thirty-Seventh Meeting

MARCH 10, 1937—STATED MEETING

The Academy met at its House at 8.35 P. M.

The Senior Vice-President, Dr. Walter B. Cannon, in the Chair.

There were present twenty Fellows and two guests.

The records of the meeting of February 10 were read and approved.

The Corresponding Secretary announced the appointment of Dr. Fred B. Lund and Dr. Bert H. Hill as delegates to represent the Academy at the Centenary celebrations of the University of Athens in April 1937.

The Corresponding Secretary reported the receipt of a letter resigning Fellowship from Joshua Whatmough.

The Presiding Officer announced the death of three Fellows: Edward Curtis Franklin (Class I, Section 3), Robert Battley Greenough (Class II, Section 4), Paul Elmer More (Class IV, Section 1); and of two Foreign Honorary Members: Paul Janet (Class I, Section 4), Vsevolod E. Timonoff (Class I, Section 4).

He appointed the Nominating Committee as follows:

John C. Slater, Class I

John W. M. Bunker, of Class II

John H. Williams, of Class III

William C. Greene, of Class IV

On the recommendation of the Council the following appropriations were voted for the ensuing year:

From the income of the General Fund, \$7,100, to be used as follows:

for General and Meeting expenses	\$ 900
for Library expenses	2,000
for Books, Periodicals, and Binding	1,500
for House expenses	2,000
for Treasurer's expenses	700

From the income of the Publication Funds, \$2,240, to be used for publication.

From the income of the Rumford Fund, \$2,250, to be used as follows:

for Research	\$1,500
for Books, Periodicals, and Binding	250
for use at the discretion of the Committee	500

From the income of the C. M. Warren Fund, \$898.70, to be used at the discretion of the Committee.

The following communication was presented:

Mr. Clyde K. M. Kluckhohn: "The Individual in Navajo Religion."

The following paper was read by title: "Postulates for Assertion, Conjunction, Negation, and Equality," by Edward V. Huntington.

The meeting was dissolved at 9.35 P. M.

One Thousand Two Hundred and Thirty-Eighth Meeting

APRIL 14, 1937—STATED MEETING

The Academy met at its House at 8.35 P. M.

The Senior Vice-President, Dr. Walter B. Cannon, in the Chair.

There were present thirty-seven Fellows and six guests.

The records of the meeting of March 10 were read and approved.

The Corresponding Secretary reported the receipt of a letter from Eldon R. James, resigning his Fellowship in the Academy.

He also announced two changes in the personnel of the Nominating Committee, Harry M. Goodwin, of Class I, replacing John C. Slater, and Arthur N. Holcombe, of Class III, replacing John H. Williams.

The Corresponding Secretary announced that the Council had made the following grants from the Permanent Science Fund:

1. To Professor Thomas Harper Goodspeed, University of California, Berkeley, \$500, for technical assistance in cytological, genetic, and morphological examination of certain species of *Nicotiana*, as an aid toward the completion of a cytogenetic monograph on this genus.

2. To Professor Rachel E. Hoffstadt, University of Washington, Seattle, \$250, to purchase animals and material needed in a study of the viruses connected with Myxomatosis of rabbits, and Herpes simplex.

3. To Professor Norton A. Kent, Boston University, Boston, \$250, to complete the installation of a 30-foot Littrow spectrograph.

4. To Professor Gustav J. Martin, College of St. Teresa, Winona, Minnesota, \$400, for technical assistance and materials needed in an investigation of the chemistry of silicosis, to be carried out in collaboration with Dr. L. U. Gardner, of the Saranac Lake Laboratory.

5. To Professors G. H. Parker and F. L. Hisaw, Harvard University, \$300, for the construction of two open sea live-cars (for keeping dogfish). These cars are to be used in their studies of color changes and of reproduction in elasmobranch fishes.

6. To Dr. Roberts Rugh, Hunter College, New York City, \$125, for the purchase of material to be used in a study of the relations and antagonisms of the pituitary and gonad hormones in Amphibia and Mammals.

7. To Mr. Curtis W. Sabrosky, Michigan State College, East Lansing, \$300, in partial support of a visit to certain European museums as a basis of study preparatory toward writing a taxonomic monograph on the dipterous family Chloropidae.

8. To Dr. A. W. Sellards, Harvard Medical School, a sum not to exceed \$325, for the purpose of having two colored plates (blocks) made to illustrate a paper on the histopathology of murine leprosy.

9. To Dr. T. E. Sterne, Harvard College Observatory, \$300, to aid in building highly sensitive thermocouples, for measuring thermal radiation of stars.

The Presiding Officer announced the death of Elihu Thomson, Fellow in Class I, Section 2.

The following communication was presented:

Mr. Frederick L. Hisaw: "A Modern View of Internal Secretions and Their Regulation of the Sexual Cycles."

The meeting was dissolved at 9.40 P. M.

One Thousand Two Hundred and Thirty-Ninth Meeting

MAY 12, 1937—ANNUAL MEETING

The Academy met at its House at 8.20 P. M.

The Senior Vice-President, Dr. Walter B. Cannon, in the Chair.

There were present fifty-two Fellows and one guest.

The records of the meeting of April 14 were read and approved.

The Corresponding Secretary reported the receipt of letters resigning Fellowship in the Academy from Warren M. Persons and Lawrence C. Wroth.

He also reported the receipt of an invitation to the Academy to be represented by a delegate at the Giotto celebration at Florence, Italy, April 27, 1937, and announced that Alfredo Casella had acted as delegate and that appropriate cablegrams had been sent.

The Presiding Officer announced the death of two Fellows: George Croft Cell (Class IV, Section 1) and William Morton Wheeler (Class II, Section 3).

The following report of the Council was presented:

REPORT OF THE COUNCIL

Since the last report of the Council there have been reported the deaths of seventeen Fellows:—George Croft Cell, Charles Thornton Davis, Oliver Lanard Fassig, Edward Curtis Franklin, Robert Battey Greenough, John Hays Hammond, Frank Arthur Laws, Paul Elmer More, Harry Wheeler Morse, Arthur Amos Noyes, Francis Greenwood Peabody, Elihu Root, Julius Oscar Stieglitz, Percy Goldthwait Stiles, Elihu Thomson, William Morton Wheeler, Francis Henry Williams; and eight Foreign Honorary Members:—Paul Janet, Henri Louis Le Chatelier, Antoine Meillet, Sir Frederick Pollock, Joseph Redlich, Charles Sanford Terry, Sir Arnold Theiler, Vsevolod E. Timonoff.

Thirty-four Fellows and six Foreign Honorary Members were elected by the Council and announced to the Academy in May 1936.

The roll now includes 774 Fellows and 118 Foreign Honorary Members (not including those elected in May 1937).

The annual report of the Treasurer, Ingersoll Bowditch, was read, of which the following is an abstract:

GENERAL FUND

Receipts

Income on hand April 1, 1936	\$2,394.02	
From Investments	\$3,208.70	
From Assessments	4,130.00	
From Admissions	270.00	7,608.70
		\$10,002.72

Expenditures

Expenses of Library	\$2,060.00	
Treasurer's Expenses	846.19	
Books and Binding	1,519.80	
General Expenses	823.50	
House Expenses	2,083.20	
President's Expenses	40.00	\$7,372.69
Interest on bonds bought	180.41	
Income transferred to Principal	320.00	\$ 7,873.10

RUMFORD FUND

Receipts

Income on hand April 1, 1936	\$ 348.07	
From Investments	2,642.00	\$ 2,990.07

Expenditures

Purchase and binding of books \$ 335.00	
Research	2,469.36
Transferred to Publication Account 200.00	\$3,004.36
Income transferred to Principal	155.45
	\$ 3,159.81

PUBLICATION ACCOUNT

Receipts

Income on hand April 1, 1936		\$1,336.93	
From Income—Appleton Fund	\$1,140.00		
From Income—Centennial Fund	1,603.11		
From Income—Rumford Fund	200.00		
From Sale of Publications	455.46		
From American Council of Learned Societies a/c Lake Publication Fund	3,250.00		
From Lake Fund subscriptions	2,453.68	9,102.25	

Expenditures

Publications—			
General Fund	\$3,615.70		
Lake Fund	5,439.99	\$9,055.69	
Vault Rent—part	4.40	\$9,060.09	
Interest on Bonds bought	\$ 4.79		
Income transferred to Principal	117.80	122.59	\$ 9,182.68

C. M. WARREN FUND

Receipts

Income on hand April 1, 1936	\$ 238.31	
From Investments	923.83	\$ 1,162.14

Expenditures

Research	\$ 751.50	
Vault Rent—part	2.20	\$ 753.70
Income transferred to Principal	46.30	\$ 800.00

FRANCIS AMORY FUND

Receipts

Income on hand April 1, 1936	\$6,108.01	
From Investments	2,653.54	\$8,761.55

Expenditures

Publishing Statement.	\$ 73.50		
Interest on bonds bought	257.02		
Vault Rent—part	6.60	\$ 337.12	

PERMANENT SCIENCE FUND

Receipts

Income on hand April, 1936.	\$ 900.00		
Received for above fund—			
Income	\$7,806.96		
Balance grants returned	93.47	7,900.43	\$8,800.43

Expenditures

Grants from above fund	\$7,807.00		
Expenses	27.00	\$7,834.00	

The following reports were also presented:

REPORT OF THE LIBRARY COMMITTEE

During the year 123 volumes and 31 unbound numbers of serials have been borrowed by 15 Fellows and 18 libraries, and more have been consulted at the Academy. All books taken out have been returned or satisfactorily accounted for.

The number of volumes on the shelves at the time of the last report was 44,765. During the year 437 volumes were added, chiefly by binding serials, making the number now 45,202. This includes 52 purchased from the General Fund, 23 from the Rumford, and 362 received by gift or exchange.

The following appropriations were placed at the disposal of the Librarian during the past year:

Balance from General Fund	\$ 838.78
Balance from Rumford Fund	10.71
Appropriation from General Fund.	3,500.00
Appropriation from Rumford Fund	325.00
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	\$4,674.49

The expenses charged to the library account during the financial year ending March 31, 1937, were:

Salaries		\$2,000.00
Binding:		
General Fund	\$753.35	
Rumford Fund	58.75	812.10
		<hr/>
Purchase of Books and Periodicals:		
General Fund	\$766.45	
Rumford Fund	276.25	1,042.70
		<hr/>
Miscellaneous		60.00
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		\$3,914.80

There remained an unexpended balance of \$759.69, as follows:

General Fund	\$ 758.98
Rumford Fund71
	<hr/>
	\$ 759.69

In accordance with the usual custom this balance will be carried over to next year.

Respectfully submitted,
HERVEY W. SHIMER, *Librarian*

May 12, 1937

REPORT OF THE RUMFORD COMMITTEE

The Rumford Committee of the American Academy of Arts and Sciences has held four meetings during the Academy year (April 1, 1936, to March 31, 1937), namely, on May 13, 1936, October 14, 1936, December 14, 1936, and February 16, 1937.

It was voted to recommend the award of the Rumford Medal to Dr. W. W. Coblentz of the Bureau of Standards.

The Committee has made the following grants in aid of research in light and heat:

1936	No.		Amount
Apr. 8	330	To Dr. Paul C. Cross, Stanford University, toward the purchase of a 21-foot grating to be used in studies of molecular spectra. . .	\$ 300
May 13	331	To Professor George R. Harrison, Massachusetts Institute of Technology, to cover cost of obtaining highly purified chemical elements for spectroscopic purposes.	400
May 13	332	To Professor Percy W. Bridgman, Harvard University, in further support of his investigations of thermal and optical properties of substances at very high pressures.	400
Oct. 14	333	To Dr. Newell Gingrich, University of Missouri, for the purchase of a Phillips Metalix copper target X-ray tube, to be used in researches on X-ray diffraction patterns of liquids.	395
Oct.	334	To Dr. Charles E. Teeter, Jr., Cambridge School of Liberal Arts, to cover in part the purchase of apparatus for his investigations on the heat capacity at constant pressures and Joule-Thomson coefficient for various gases.	300
Dec. 14	335	To Professor Donald C. Stockbarger, Massachusetts Institute of Technology, in support of his work on calcium fluoride crystallization.	400
Total			\$2,195

Respectfully submitted,

HARLOW SHAPLEY, *Chairman*

May 12, 1937

REPORT OF THE C. M. WARREN COMMITTEE

The Committee had at its disposal during the fiscal year 1936-1937, \$1,065.84, of which \$1,050 was appropriated to aid scientific investigations.

Since the last annual report grants have been made as follows:

Professor Gordon H. Scott, of Washington University, \$200, to be

used to continue his researches on the inorganic salts of mammalian organs, tissues and cells with the use of an electron microscope.

Professor Hermann Schmid, Technische Hochschule, Vienna, \$150, to continue his researches in the study of intermediate compounds formed in chemical reaction and a detailed examination of the diazotizing process.

Dr. William F. Ross, Rockefeller Institute for Research, \$200, to be used to purchase expensive amino acids for a research involving the synthesis of certain peptides.

Professor George Scatchard, Massachusetts Institute of Technology, \$200, for apparatus needed to continue his research on the determination with the highest degree of precision of freezing point depression, boiling point elevation and vapor pressure.

Dr. Lawrence J. Heidt, Massachusetts Institute of Technology, \$300, to purchase a large Cornu Prism to be used:

(1) in the study of the effect of certain gases and vapors upon quantum yields in the decomposition of ozone,

(2) in the study of the intramolecular transfer of energy,

(3) in the investigation of change with wave length and temperature of photochemical decomposition products.

Seven applications for grants, totaling \$2,060, will be acted upon at the next meeting of the committee.

Reports have been received from Messrs. Allen, Bradt, Duncan, Heidt, Huntress, Richtmeyer, Ross, Schmidt, Teeter.

The papers listed below, which have not been previously reported, describe the results of investigations aided by the Warren Fund. In each case there is an acknowledgment by the author of the assistance received.

A. B. F. Duncan. "The Ultraviolet Absorption Spectrum of Ammonia. III. The Absorption Spectra of the Deuteroammonias. A Note on Rydberg Series in Ammonia," *Physical Review*, 50, 700 (1936).

A. B. F. Duncan, "The Far Ultraviolet Absorption Spectrum of N_2O ," *Journal of Chemical Physics*, 4, 638 (1936).

Nelson K. Richtmeyer and C. S. Hudson. "The Rearrangement of Sugar Acetates by Aluminum Chloride. Crystalline Celtribiose and Some of its Derivatives," *J. Am. Chem. Soc.*, 58, 2534 (1936).

Frederic C. Schmidt, Joseph Sottysiak and Herman D. Kluge.

"Heats of Solution and Heats of Reaction on Liquid Ammonia," *J. Am. Chem. Soc.*, 58, 2509 (1936).

Carl L. A. Schmidt and R. Brdicka. "On the Formation of Carbamates in Solutions of Glycine and of Alanine Containing Sodium Carbonate," *University of California Publications in Physiology*, Vol. 8, No. 9, pp. 119-128 (1936).

Hermann Schmid. "Thermodynamik der Zwischenreaktionen," *Zeitschrift fur Elektrochemie*, 42, 579-582 (1936).

Hermann Schmid. "Über den Mechanismus der Diazotierung," *Ber.* 70, 421 (1937).

JAMES F. NORRIS, *Chairman*

May 12, 1937

REPORT OF THE COMMITTEE OF PUBLICATION

During the year 1936-37 the Committee of Publication has held three meetings, and has carried on the rest of its business by conferences and by correspondence. Nine numbers of the Proceedings have been published during this year (Volume 71, numbers 3 to 10, and Volume 72, number 1). There have been no Memoirs. Of the first series of *Monumenta Palaeographica Vetera* ("Dated Greek Manuscripts," edited by Professor and Mrs. Kirsopp Lake), two more fascicles (V and VI) have appeared. The Academy has been generously assisted in the publication of this series by a further grant from the American Council of Learned Societies (a maximum of \$6,000, in support of fascicles VI-X inclusive, to be drawn as needed), contingent on the Academy's contributing toward the series a portion of its annual appropriation for publication. During the past fiscal year the Academy thus received from the American Council of Learned Societies not only the sum of \$1,250, previously granted, but \$2,000 from the new grant. There are at present about 80 subscribers to this series.

The amounts received and expended by the Committee during the fiscal year ending March 31st are shown in the following statements:

*General Publication Fund**Receipts*

Balance, April 1, 1936	\$1,047.82
Appropriation, 1936-37	2,367.17
Rumford Fund, grant 1936-37	200.00
Sale of Publications	455.46

 \$4,070.45
Expenses

Transferred to Lake Publication Fund	\$ 600.00
Printing, Proceedings, General Fund	2,647.65
Printing, Proceedings, Rumford Fund	200.00
Other expenses, postage, trucking, etc	172.45
Balance, April 1, 1937	450.35

 \$4,070.45
*Lake Publication Fund**Receipts*

Balance, April 1, 1936	\$ 148.77
Transferred from General Publication Fund	600.00
Subventions from American Council of Learned Societies	3,250.00
Subscriptions received	1,853.68

 \$5,852.45
Expenses

Plates, Fasc. V	\$1,365.32
Text and Binding, Fasc. V	625.90
Plates, Fasc. VI	1,466.57
Text and Binding, Fasc. VI	543.90
Plates, Fasc. VII	1,351.24
Other expenses, postage, storage, insurance, etc.	87.06
Balance, April 1, 1937	412.46

 \$5,852.45

The Committee has for several years carried on the publications of the Academy in spite of decreasing appropriations. In the Proceedings it is expected to give members preference over non-members, and to maintain a proper balance with respect to the various fields of research. This year it has been necessary to decline several papers by non-members, and to delay the publication of papers by members for which there were not sufficient funds. The publication of one paper by Professor Percy W. Bridgman (71-9) was assisted by a subsidy from the Rumford Fund; the publication of another paper by Dr. John M. Bruhn and Dr. Francis G. Benedict (71-5) was made possible by a subsidy, not included in the figures given above, from the Carnegie Institution.

In the opinion of the Committee there is a question whether in some fields research is not getting ahead of the ability of the Academy to publish the results of research, keeping a fair balance among the various fields, unless the Academy can find more funds, or unless research funds contribute toward the costs of publication.

The retiring Editor wishes to record his appreciation of the efficient services and the sound policies of his predecessors.

Respectfully submitted,

WILLIAM C. GREENE, *Chairman*

April 30, 1937

REPORT OF THE HOUSE COMMITTEE

The House Committee has had at its disposal funds amounting to \$2,766.92, made up as follows:

Balance from previous year	\$ 521.92
Appropriations for 1936-37	2,000.00
Received for use of rooms	245.00
	<hr/>
	\$2,766.92

Of this amount the sum of \$2,185.07 has been spent for the routine expenses, janitor, light, power, heat, telephone, etc., and \$143.13 has been spent for upkeep and equipment, making a total expenditure of \$2,328.20, and leaving an unexpended balance of \$438.72.

Meetings have been held as follows:

The Academy	8
American Chemical Society, Northeastern Section	8
Archaeological Institute of America, Boston Society	2
Friends of China, Inc.	3
Geological Society of Boston	1
Japan Society of Boston	3
Mediaeval Academy of America	1
New England Botanical Club	9
Surgical Society	1
Thursday Evening Club	1
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Total	37

The Council Chamber has been used for the Academy Council and Committee meetings, and also by the Trustees of the Children's Museum, the New England Farm and Garden Association, etc.

A detailed list of expenditures follows:

Janitor	\$ 981.00
Electricity: Power	47.71
Light	182.78
Fuel	647.90
Elevator	100.55
Gas	45.00
Telephone	107.13
Water	33.12
Ash tickets	19.80
Upkeep	52.90
Furnishings and equipment	90.23
Janitor's supplies and sundries	20.08

\$2,328.20

Respectfully submitted,

S. B. WOLBACH, *Chairman*

May 12, 1937

On the recommendation of the Rumford Committee, the Academy *Voted*, to award the Rumford Premium to Dr. William Weber Coblentz for his distinguished work in the zone of science comprising heat and light.

On the recommendation of the Treasurer, it was *Voted*, that the annual assessment for the ensuing year be ten dollars.

The annual election resulted in the choice of the following officers and committees:

DUGALD CALEB JACKSON, *President*
 JAMES FLACK NORRIS, *Vice-President for Class I*
 WALTER BRADFORD CANNON, *Vice-President for Class II*
 GEORGE GRAFTON WILSON, *Vice-President for Class III*
 ARTHUR STANLEY PEASE, *Vice-President for Class IV*
 LEIGH HOADLEY, *Corresponding Secretary*
 TENNEY LOMBARD DAVIS, *Recording Secretary*
 INGERSOLL BOWDITCH, *Treasurer*
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The Corresponding Secretary announced that the following had been elected members of the Academy:

FELLOWS

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George Walter Stewart, Iowa City, Iowa
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- Section 3.* John Tileston Edsall, Cambridge
Gustavus John Esselen, Swampscott
- Section 4.* Joseph Henry Keenan, Medford
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- Section 3.* Alfred Sherwood Romer, Cambridge
- Section 4.* Walter Walker Palmer, New York, N. Y.

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- Section 1.* Clarence Henry Graham, Providence, R. I.
Louis Leon Thurstone, Chicago, Ill.

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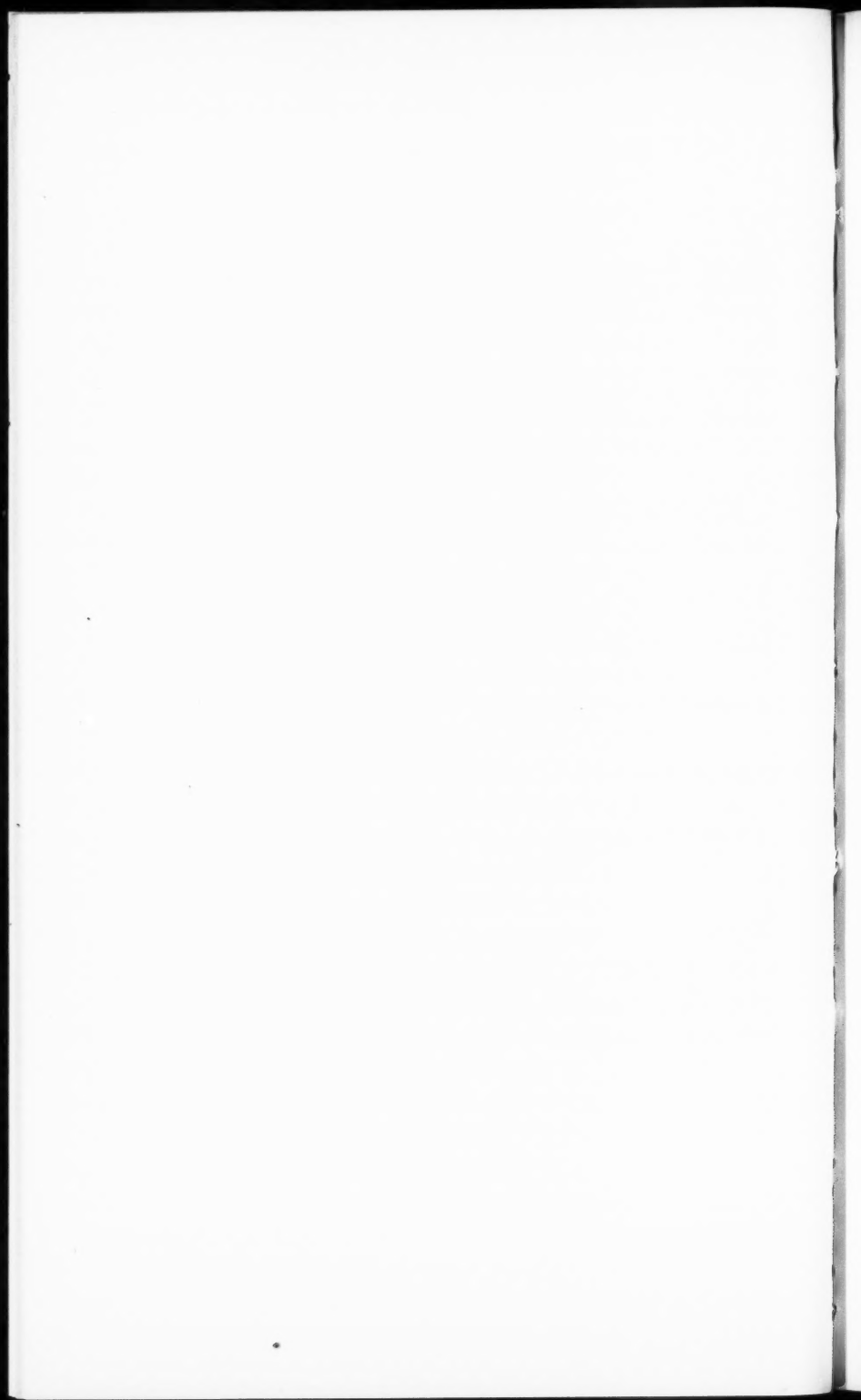
CLASS IV

- Section 1.* Henri Piéron, Paris

The following communication was presented:

Mr. Percy W. Bridgman: "Physical Phenomena at High Pressure."

The meeting was dissolved at 10.05 P. M.



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LEBARON RUSSELL BRIGGS (1855-1934)

Fellow in Class IV, Section 4, 1908

LeBaron Russell Briggs, Fellow of the American Academy of Arts and Sciences, and Boylston Professor of Rhetoric and Oratory, *Emeritus*, in Harvard University, died at Milwaukee on April 24, 1934. He was born in Salem, Massachusetts, December 11, 1855, the son of George Ware Briggs and Lucia Russell Briggs. He graduated at Harvard in 1875, and in 1882 received his Master's degree from Harvard. He was tutor in Greek from 1878 to 1881, instructor in English from 1883 to 1885, Assistant Professor of English from 1885 to 1890, Professor of English from 1890 to 1904, and Boylston Professor from 1904 to 1925, when he retired. He was Dean of Harvard College from 1891 to 1902, Dean of the Faculty of Arts and Sciences from 1902 to 1925, Overseer from 1926 to 1932, President of Radcliffe College from 1903 to 1923. In the second half-year of 1918-1919 he was Exchange Professor with France. He received the honorary degree of LL.D. from Harvard in 1900, from Western Reserve University in 1906, and from Yale University in 1917; and the degree of Litt.D. from Lafayette College in 1907.

This factual array of Briggs's achievement merely indicates the scope of his activities. It gives no hint of the spirit which informed them. For example, the honorary degree from Yale was due not only to Briggs the scholar and writer, but also to Briggs the sportsman, who infused athletic relationships among American universities with a spirit of fairness hitherto unknown. Above his enthusiasm for athletics in themselves, played an honesty, a delight in technique, and a simple friendliness, that also shone over his work in the class room, his administration of the Dean's office, and the ordering of his own life. It may be said of the Dean that thousands of men and women, of widely differing interests, knew him as friend, and not one fails in devotion to his memory.

His career had an uncertain start. President Eliot was still young enough to be overcautious when in 1878 he gave Briggs a tentative appointment. To the end of Briggs's life, his lack of dogmatism, his patient tolerance, lent to his convictions a mildness of expression which was sometimes mistaken for unsureness. No one would make such a mistake for long. Behind the shy smile a shrewd intellect, guided by

principle, appraised men, books, and ideas. Books and ideas are final commitments; for them there was only acceptance or rejection. But men are malleable, and the Dean suspended judgment. To this day thousands are better in English syntax, in demeanor, and in general intelligence, not because they are thinking of what Dean Briggs would say—he was far too self-effacing for that—but because, in some mysterious fashion, he set up for each mind the pattern that should be its own. He generally opened his classes with a passage from Thoreau, in which the individual is urged to march to his own rhythm, “however faint, however far away.” But it must be an honest rhythm.

Doubtless his spiritual strength was renewed by the country life which he loved. In his place on Long Pond, near Plymouth, he was most at home. Here were his horses, his dogs, Robert Browning the cat, and a long succession of pets, some of which moved back with the family for a Cambridge winter. From here he dispensed country products—often making the trip himself—to young friends in Cambridge who had need of them. He seemed to have always within him the serenity of that countryside,—its unchangingness,—and the native humor of its people. In the spring after the war, when the Dean was Exchange Professor in Paris, he and the present writer stood at twilight on the Pont Alexandre III. Paris was doing all it could do to live up to the oft-repeated lavender mists and chestnut blossoms. “Beautiful,” he said, “but I miss Plymouth.”

His writings are not sufficiently known. The essays on college life, in spite of changes in undergraduate customs, remain, fundamentally, as wise and as applicable as when they were written. His serious verse, such as the Plymouth Tercentenary Ode, is profoundly felt and well-wrought. But his Charades in verse probably gave him more pleasure than his serious writings. These were his recreation: the joyous offering up of scholarship and pedagogy on the altar of wit. No one else could have written them.

Happy in his family, his friendships, and his career, he remains the pattern of a great life, upheld amid a chaotic era, yet upheld without benefit of the cloisters. He was not withdrawn. On the contrary, he delighted to share, with anyone who could share, the fruits of his learning. He was the most beloved, the most justly beloved, teacher in our history.

ROBERT HILLYER

WILLIAM HUBERT BURR (1851-1934)

Fellow in Class I, Section 4 (1914)

William Hubert Burr was born at Watertown, Connecticut in July, 1851. After studying with a private tutor, he entered the Rensselaer Polytechnic Institute in October, 1868, and was graduated in 1872 with the degree of Civil Engineer.

Following some miscellaneous engineering experience, he returned to Rensselaer in September, 1875, as acting professor of theoretical and practical mechanics. In December, 1876, he was made professor of these subjects, and in June, 1883, was appointed the William Howard Hart professor of technical and rational mechanics. During this period he published several important papers and books dealing with bridge engineering and mechanics. The best known and most important of these is the monumental book entitled "Elasticity and Resistance of the Materials of Engineering," which was first published in 1883 and ran through several editions.

In 1884 he accepted a position with the Phoenix Bridge Company of Phoenixville, Pennsylvania, a leader in the field of metal bridge construction, and remained with this company until 1891, first as assistant to the Chief Engineer and then as General Manager. During this period he played an active part in the development of the methods of design and construction of iron bridges.

In 1891 he left the Phoenix Company to become Professor of Civil Engineering at Harvard College where he remained until 1893, at which time he was appointed Professor of Civil Engineering at Columbia University, which position he held until retirement in 1916 to become Professor Emeritus of Civil Engineering.

During his long connection with Columbia, he achieved distinction in the consulting field comparable with that he had already won in educational circles. President Cleveland appointed him to a public board to investigate the possibility of a one-span bridge across the Hudson in New York City. By appointment of President McKinley he served on boards dealing with the Isthmian Canal problems, and in 1904 he was appointed by President Roosevelt as a member of the famous International Board of Consulting Engineers which decided the question of whether to build at Panama a sea-level or a lock canal. In 1911 he was appointed by the Governor of New York as a

member of the Board of Engineers to advise on the design of the New York State Barge Canal, and he was a consulting engineer on the Water Supply of New York City from 1903 until his death. He also served as consultant to the Port of New York Authority upon bridges built by this organization, including the George Washington Bridge over the Hudson River.

At the time of his death, he was the oldest member, in years of affiliation, of the American Society of Civil Engineers, which he joined in 1874 and in which he served as a Director from 1894 to 1896. In 1891 the Society awarded him the Thomas Fitch Rowland Prize. He was also a member of the Institution of Civil Engineers of Great Britain, which membership he valued highly. Amongst other honors which came to him during his long life was the award by the Japanese Government of the Order of the Sacred Treasure (2d Degree).

For many years he served as a Trustee of the Cathedral of St. John the Divine in New York City. His clubs included the Century Association and the University Club of New York City, and he was also a member of the Pilgrims and of the Society of the Cincinnati.

He was married in 1876 to Caroline Kent Seelye of New York City who died in 1894, and in 1901 he married Gertrude Gold Shipman, a sister of the late Bishop Shipman. The children of his first marriage were George Lindsley of New York City, Marion Elisabeth (Mrs. James A. Mars), and William Fairfield; and of his second marriage, Anne Louise (Mrs. S. Bayard Colgate).

His death occurred in New York City in December, 1931. A fuller account of Professor Burr's life occurs in Volume 100 of the Transactions of the American Society of Civil Engineers.

CHARLES M. SPOFFORD

GEORGE CROFT CELL (1875-1937)

Fellow in Class IV, Section I, 1932

George Croft Cell was born in St. Thomas, Pennsylvania, February 20, 1875, the son of John W. and Mary Ellen Cell. In 1901 he married Cornelia Ella Clark of Kansas City, Kansas. She and two children, Clark Wesley and Cornelia Ella, survive. Dr. Cell received from Baker University the A.B. degree in 1901 and the honorary degree of LL.D. in 1936. At Boston University he was granted the S.T.B.

degree in 1904 and the Ph.D. degree in 1908. He studied at Berlin University from 1904 to 1907, doing his major work under Professors Riehl, Paulsen, and Harnack. In 1908 he was elected Professor of Historical Theology in Boston University, a position that he held till his death on April 18, 1937.

Dr. Cell was a creative mind. Never content with current thought he was always seeking to revise the opinions of the past. His Doctor's thesis was an attempt to prove that Immanuel Kant's relation to theism was different from that which has been commonly held. In an unpublished work on the Christology of the early church he sought to break new paths in this well trodden field. Later he tried to prove that the current view with reference to the relation of Borden P. Bowne to William James was mistaken. His study of this subject led him to accept an invitation to write the section on "Die Philosophie in Nord Amerika" for the fifth volume on Ueberweg's *Grundriss der Geschichte der Philosophie*. Still later he wrote an extended work, entitled *The Rediscovery of John Wesley*, in which he sought to revise the traditional conception of John Wesley's relation to Calvinism. This work has attracted wide attention and is destined to have considerable influence on the future study of Wesleyan theology.

Dr. Cell was a vigorous writer and inspiring teacher. Though devoting most of his time to the field of Church History he was deeply interested in current political and social questions and seldom failed to enliven his class room lectures by references to current events. He was an ardent advocate of the temperance cause and an enthusiastic "Progressive" in politics. He wrote extensively and spoke frequently on the problems of the day, and always in an able, original, and convincing manner. He was a striking personality and will long be remembered by those who were privileged to know him and to study under him.

ALBERT C. KNUDSON

GEORGE PERKINS CLINTON (1867-1937)

Class II, Section 2, 1914

The annual loss to agriculture from the depredations of plant diseases has been estimated to be anywhere from half a billion to three billion dollars. Whatever may be the true figure, it is a serious

loss. The only protection the public has against it is a home guard, smaller than an army regiment in times of peace, composed of fighters armed with that knowledge of the character and habits of the enemy which comes from a thorough training in the botanical discipline termed plant pathology. One of the staff officers of this guard, a distinguished and esteemed member of the American Academy of Arts and Sciences, was lost to the service with the death of George Perkins Clinton, on August 13, 1937. Actually, he was killed in action, for his death came suddenly, after over-exertion on a hot day, while planning new experiments to try to stop the inroads of certain fungous parasites.

Dr. Clinton was botanist at the Connecticut Agricultural Experiment Station in New Haven, Connecticut, for thirty-five years. In addition to his duties there, he was lecturer on forest pathology at Yale University from 1915 to 1926, and was research associate in botany at the same institution from 1926 to 1929.

Clinton came from old American stock, of the pioneer type, which had pushed from the East to the Middle West. He was born in Polo, Illinois, on May 7, 1867. His father was not a farmer, but a newspaper man. Nevertheless, he was so deeply imbued with the importance to the country of agricultural welfare that he made this his own paramount concern, receiving recognition from the College of Agriculture of the University of Illinois for his services. The son followed his father's interests in agriculture, though along a different path. He was drawn very early to the study of plants, starting a herbarium when a young boy, to which he continued to add throughout his life.

Formal botanical training began at the University of Illinois, in 1886, under T. J. Burrill, a great teacher and investigator who is best known for his discovery of bacteria as causal agents in plant disease. Here Clinton received the degree of B.S. in 1890, and the degree of M.S. in 1894.

Upon graduation, he became assistant botanist at the University of Illinois Agricultural Experiment Station and assistant in botany on the teaching staff. There he remained for ten years, leaving only to continue study under Professors Farlow and Thaxter at Harvard. Harvard University conferred the M.S. degree on him in 1901 and the Sc.D. degree in 1902. Immediately thereafter, he became attached

to the staff of the Connecticut Agricultural Experiment Station, where he worked happily and successfully to the end.

Absences from New Haven were of short duration, for the job of trying to reduce agricultural losses from endemic or well established plant diseases and to prevent invasions by new ones throughout the entire State of Connecticut, was by no means an easy one. And the journeys undertaken were, for the most part, professional. In 1904, he was sent to Porto Rico by governmental authorities to study coffee rust; in 1908, he was asked to collaborate with Harvard authorities in investigations designed to control the spread of the brown-tail moth; and, in 1909, he was sent on an expedition to Japan, financed by Harvard University to obtain a fungus parasitic on the gypsy moth, in the hope that it might be of service in reducing the ravages of that troublesome insect.

At these and other times, Clinton collected fungi in Canada and on the east coast of the United States, in the Mid-Western states, Europe, Hawaii, Japan, Porto Rico, and Panama, thus building up a cryptogamic herbarium which has become known as one of the best in the country. This collection has now been given to the Connecticut Agricultural Experiment Station, together with a large assemblage of literature on plant pathology.

The value of these collecting trips did not lie wholly in adding definite numbers of named specimens, however, or even in making comparisons with types reposing in other herbaria. Clinton was a keen observer, always on the watch for infestations of new diseases or new locality records for old diseases. Because of this capacity, his journeys were notable as scouting expeditions. More than one State Botanist owes his opportunity to repress the predaciousness of a parasite with a fair degree of ease, to the Clintonian eye which had noted an infection new to the locality.

Clinton's scientific papers numbered about one hundred and twenty-five, and date back to 1893. In addition, his extraordinary activity, his mental and physical drive, is shown by the fact that he was the author of eighteen published reports to the Connecticut Vegetable Growers' Association, of twenty Connecticut Agricultural Experiment Station Bulletins of Immediate Information (frequently with others), and of twenty-four Reports in the Proceedings of the Connecticut Pomological Society. Nor was his literary output the sole measure

of his energy. He was a frequent lecturer before various agricultural societies; and he was influential, because his expositions were clear as well as enthusiastic, and his remedies were practical as well as sound in theory. For years, his participation in the various proceedings occupying the attention of the societies devoted to forestry, pomology, and vegetable growing was such that they owed much of their spirit of energy to him. His work on wildfire of tobacco was perhaps the main incentive for the founding of the tobacco sub-station at Windsor.

It is difficult to evaluate properly Clinton's work in plant pathology. He was public health officer to the plant population of Connecticut, and every disease drew his attention. But he was not content to report perfunctorily the numerous types encountered, and to record the efforts being made to control or to eradicate them. The writer has been told, repeatedly, by co-workers in the field, that they always expected something above and beyond the ordinary, even in the routine reports on the plant diseases of the state; and they were never disappointed. Some new observation on a life history, some suggestion on technique, ideas of one kind or another, were always there. Naturally, these notes did not often contain great discoveries; but they were always helpful, and other pathologists could not afford to disregard them.

Specifically, the contributions for which Clinton will always be remembered are those upon the smuts, the downy mildews, the chestnut bark disease, the rusts—particularly the white pine blister rust, the peach yellows, and other mosaics due to filterable viruses, and certain diseases attributable to bacteria.

Clinton was an authority on smuts. He first published a preliminary paper on North American Ustilagineae in the *Journal of Mycology* in 1902. This was followed by a complete monograph of 200 pages, published by the Boston Society of Natural History in 1904. Additional taxonomic material appeared in *Flora* in 1906.

But Clinton was an experimentalist at heart rather than a pure taxonomist. His very complete treatment of the downy mildews cleared up dubious points regarding their taxonomic status, it is true; nevertheless, this was because experimental culture, with improved technique, provided the possibility of describing accurately and figuring carefully the various reproductive stages. The outstanding feature of this work was the discovery of the oöspores of the late

blight or downy mildew of potatoes, *Phytophthora infestans* (Mont.) De By.

Experimentation continued to play a greater and greater part in Clinton's scientific life, as time went on. Sometimes, it was on matters purely practical, as when, among the first, he tested the efficacy and recommended the use of Bordeaux mixture in the control of potato blight. Sometimes, it was in connection with improved technique, as when, about 1924, he developed methods for testing the susceptibility to white pine blister rust of detached leaves, kept in Petri dishes, thus not only cutting down the time of making proper tests but also preventing the possibility of spreading the disease accidentally. He later applied this method to his studies of life histories of various peridermiums. Again, it concerned botanical theory, as when he contributed to the knowledge of the aecial stages of the heteroecious rusts, or when he threw new light on the relations of nematodes to leaf infections of certain greenhouse plants, or when he made such helpful communications on the behavior of tobacco mosaic.

Dr. Clinton was a slender, wiry man,—an eastern Cappy Ricks in appearance, with the incredible capacity for work of that beloved character. He was never too busy, however, to help a comrade, or a colleague, to the best of his ability; and his comments never failed to show a keen insight into the problem under discussion. The writer knew him for over thirty years, and at no time heard him say a word about an acquaintance that could be called cheap, or mean, or disagreeable. He was a friend worth having.

The merit of his contributions to agricultural welfare and to botanical science was recognized early by all those in the same line of work. He was so modest and unassuming, however, with such a distaste for self-advertisement, that prima donna honors were never courted. Nevertheless, it was a source of satisfaction to those who knew him when, in 1930, he was elected to the National Academy of Sciences.

Clinton married Anna J. Lightbody of Pekin, Illinois, on August 9, 1892. There was one child, Harry Lightbody Clinton. He was killed in France, fighting with the American troops in the World War. This loss saddened the latter part of his father's life. He never lost his sense of acute grief. Work in increasing amounts was his means of escape.

E. M. EAST

CHARLES ALLERTON COOLIDGE (1858-1936)

Fellow in Class IV, Section 4, 1918

Charles Allerton Coolidge, Architect, was born in Boston on November 30, 1858. As his associations on both sides of the family were with New England, being a descendant of the John and Mary Coolidge who settled at Watertown, Massachusetts in 1631, it is not surprising to find his major activities in the same environment. He was educated at the Hopkinson School of Boston and graduated from Harvard in 1881. Upon graduation, he followed a special course in Architecture at the Massachusetts Institute of Technology, one of the many distinguished architects who for three generations past have received their professional education under the kindly guidance of Professor Ware or Professor Chandler.

After three years in the offices of Ware and Van Brunt and of H. H. Richardson, the firm of Shepley, Rutan and Coolidge was organized in 1886 to carry on the work left unfinished upon the death of H. H. Richardson. The firm of Coolidge and Shattuck succeeded to the responsibilities of the earlier organization, to be in turn replaced by that of Coolidge, Shepley, Bulfinch and Abbott in 1924, of which Coolidge was the senior member until his death. Inheriting the work of such an internationally known figure as H. H. Richardson, these successive firms made notable contributions to architecture in widely scattered parts of this country, as well as in and around Boston. In all of this work Coolidge took an active personal interest which was apparent in the design of individual buildings, marking them strongly with an expression of his personal taste. Notable among his architectural accomplishments are buildings for Stanford University, California; the Ames Building and Buildings of the Old Colony Trust Company; Boston Safe Deposit and Trust Company; Merchants National Bank, Massachusetts General Hospital, Children's Hospital, Boston Lying-In Hospital; and Harvard Freshman Dormitories, Harkness House Units, and the Harvard Memorial Chapel, in Cambridge; Tower Group and Harper Memorial of the University of Chicago, and the Public Library, Art Institute, Corn Exchange Bank Building and Harris Trust Building in Chicago; and buildings for the Rockefeller Institute for Medical Research in New York and Princeton.

Mr. Coolidge served the community in which he lived in many capacities—was Park Commissioner for seven years, Clerk of the Home for Aged Men, an Overseer of Harvard College, President of the Boston Society of Architects, Trustee of the Boston Museum of Fine Arts, to mention only a few. Recognition of his qualities came to him from all directions but he particularly valued his position as President of the Society of the Cincinnati as well as being made a Chevalier of the Legion of Honor of France and receiving the honorary degree of Art.D. from Harvard in 1906.

The unfailing tact and rare charm that characterized all of his social relations endeared Coolidge to a wide circle of friends. Among his intimates he radiated a happy friendliness that belied his advancing years. But no picture of his human relations, whether professional or social, would be complete that did not pay tribute to the inspiration, the balance, the devotion that he received from his wife, Julia Shepley. Her unobtrusive, constant, and self-less care of his every interest was the power that raised his many qualities to their finest expression.

WILLIAM EMERSON

ROBERT BATTEY GREENOUGH (1871-1937)

Fellow in Class II, Section 4, 1918

Robert Battey Greenough died suddenly February 16, 1937, in his sixty-sixth year.

He was born at Cambridge, Massachusetts November 9, 1871, the son of James Bradstreet and Mary (Ketchum) Greenough. He prepared for college at Hopkinson's School in Boston, graduating from Harvard in 1892 with the degree of A.B. *cum laude*. The next fall he entered Harvard Medical School from which he graduated in 1896 *cum laude*.

He married Amelia Mackay Goodwin in Cambridge October 16, 1900. His widow and four daughters survive him.

He began his connection with the Massachusetts General Hospital as a surgical house officer on August 1, 1895 and was devoted to that institution throughout his life, passing through various grades up to consulting surgeon which position he held at the time of his death.

In March 1897 he went abroad, spending most of his time in Vienna where he devoted his energies to the study of pathology. This period

had a great influence on his later professional career. He returned to this country in the latter part of 1897 to become associated with Dr. John Collins Warren as his private assistant. His interest in tumors was greatly stimulated by Dr. Warren. This was soon after the publication of the International Text-Book of Surgery had established Warren's status as a great scholar in surgery. Dr. Warren and Dr. Oliver were co-trustees of the Caroline Brewer Croft Fund for Cancer Research and Dr. Greenough's first article on "Plimmer's Bodies in Carcinoma" appeared in the first report of the Committee published in 1900.

In 1905 Dr. Greenough was appointed secretary of the Committee, holding that position until 1909 when the Croft bequest, combined with other funds, was placed in the hands of the Cancer Commission of Harvard University.

When the Collis P. Huntington Memorial Hospital was built in 1912, Dr. Greenough became surgeon of the institution. From 1915 to 1929 he held the position of director of the Commission and acted as consulting surgeon to the hospital up to the time of his death.

During the war, his research was interrupted by his service with the Harvard Unit at the American Ambulance at Neuilly-sur-Seine where he served as surgeon and executive officer and again when he joined the Medical Corps of the Naval Reserve and was on duty at the United States Naval Hospital in Chelsea as Chief of the Surgical Service. Although each of these gave him an opportunity to demonstrate his ability as a general surgeon and to display his wonderful powers as an organizer, it was not the kind of work he longed for and he was glad to get back to research, especially in the field of cancer, and to his services at the different hospitals.

Dr. Greenough held various teaching positions at the Harvard Medical School. In 1901 he was appointed Assistant in Surgery, becoming instructor in surgery in 1905 and assistant professor of surgery in 1910. This last position he held until 1932 when he reached the retiring age at the Massachusetts General Hospital and gave up his active service there.

Teaching at the medical school was a very small part of what he did for the advancement of medicine. He is best known for his contribution in the fight against cancer and to this his energies were devoted all the latter part of his life, a fight for which his thorough

knowledge of general surgery fitted in so well with his grounding in pathology, his various hospital appointments, and his tact and organizing ability. The establishment of consultation cancer clinics was his idea, the one at the Huntington Hospital being the first in this part of the country. One at the Massachusetts General Hospital soon followed and now they have spread all over the state and, under the guidance of the American College of Surgeons, throughout the country. At the time of his death he was President of the American Society for the Control of Cancer. He founded the Committee of the American College of Surgeons for the treatment of malignant diseases. He was its chairman for eleven years and continued as an active member in its cancer campaign. He lent his powerful aid when the State embarked on its hitherto untried State cancer hospital at Pondville and he organized the various State cancer clinics.

Always ready for any amount of work, he gave his time freely and generously in talking before the doctors conducting these clinics, helping choose proper men to run them, and aiding in every way when his advice was asked. He was an inspiring teacher and so generous with faults and mistakes of others in starting new ventures that he made few enemies and hosts of friends, especially among the younger men and his own students and assistants. What the profession at large thought of his ability can be judged not alone by his work but by the honors which they heaped upon him. He was a member of the Massachusetts Medical Society, one of its council for several years, and its president in 1934-1935. He was a member of the American Surgical Association. A Fellow of the American College of Surgeons, he was one of the Board of Governors from 1923 to 1925, a Regent from 1924 to 1937, vice-chairman of the Board of Regents and its Executive Committee from 1935 to 1937, and president of the College from 1934 to 1935. He was a Fellow of the American Academy of Arts and Sciences. This list covers only a part of the marks of recognition which came to him.

Dr. Greenough's death is a great loss to the profession. It is indeed seldom that a doctor combines such skill in surgery with such an interest in and knowledge of the scientific work that is being done by other workers, and rarer still, to find a general surgeon who contributes really valuable research in the laboratory. Such a man was Robert Greenough and it will be difficult indeed to find any one man to carry on all of his many works.

FRANKLIN G. BALCH

PAUL (ANDRÉ-MARIE) JANET (1863-1937)

Foreign Honorary Member in Class I, Section 4, 1934

Born in Paris, France, January 10, 1863, Paul (André-Marie) Janet sprang from a family of culture. His father was Paul Janet, Professor of Philosophy at the Sorbonne, and the young Janet was brought up along the best French lines which lead to a life of scholarly productivity. At nine years of age, he entered the Lycée Louis-le-Grande in Paris, where his father at one time had been professor of logic. While he was still a student at the Lycée, the Paris International Electrical Exposition of 1881 and its attendant International Congress deeply stirred his enthusiasm. Perhaps this was the stimulus which turned him toward physical science. In any event, he completed his work in the Lycée in 1883, entered l'École Normale Supérieure where he studied under Violle, and from there he departed as an agrégé des sciences physiques in 1886.

Thereupon, at the age of 23 years, he began his active work in creative science and education in a position under the Faculty of Sciences in Grenoble to which he was recommended by Violle. In 1893 he was made a Professor in the Faculty at Grenoble. In the meantime, stirred by the industrial traditions of Grenoble and the influences of electric-power experiments made in the neighborhood, he turned his principal thoughts toward developing instruction in applied electricity. Aided by the industries of the area, he succeeded in establishing an Institute of Electrotechnics in Grenoble which Institute possessed (for its day) a well developed industrial laboratory. He was among the pioneers of this work in France and soon became a leader on account of his scientific acumen, his enthusiasm for the combination of theory with practice and of teaching with research, and his delightful personal qualities. He was deeply impressed by the importance of such education as an aid in developing industry. In association with his teaching he wrote a number of books in the field of applied electricity.

In 1894, at the instance of Mascart, he was called to the Sorbonne for work in the Physics Department of the University of Paris; and also to undertake the development of the École supérieure d'Électricité, then being established with the aid of the French government under the patronage of the Société Française des Électriciens and with which

was associated the previously established Laboratoire centrale d'Électricité. His qualities as the chief officer led to great success for these enterprises.

He received many honors and medals, was called upon to sit in numerous national and international committees within the fields of scientific standards of measurement and other aspects of applied science, and not uncommonly was president of such committees. At the time of his death, in addition to being a Foreign Honorary Member of the American Academy of Arts and Sciences, he was a member of the French Academy of Sciences, also of those of Roumania and Brazil, and member of the Academy of Technical Sciences of Warsaw, Honorary Professor at the Sorbonne, Honorary President of the Société Française des Électriciens, Honorary President of the International Electrotechnical Commission, Past-President of the International Electrical Congress of 1932, Past-President of the Société des Ingénieurs Civils, Past-President of the Société Française de Physique, and honorary member of other societies; recipient of the Médaille Ampère in 1913 and the triennial Médaille Mascart in 1930. He was twice a laureate of the French Academy of Sciences and his writings on applied electricity brought various prizes. He had represented the French government in scientific conferences abroad and been decorated by the governments of Poland, Roumania, Sweden, and Turkey. He was a Commander of the Légion d'Honneur of France.

During the past dozen years he gave much thought to preserving memorials of Ampère and it was through his origination that the boyhood residence of Ampère has been preserved. An important room in this building will hereafter bear his name, with the inscription "À la mémoire de Paul Janet, Membre d'Institut, 1863-1937, Membre fondateur de la Société des Amis d'André-Marie Ampère. Il sauva cette maison de l'oubli et fut un bienfaiteur pour cette musée."

Despite his numerous activities of national and international import, he lived a happy married life and rejoiced in the affectionate association with his devoted wife (daughter of a professor in the Lycée Louis-le-Grand), distinguished children and group of grandchildren.

At memorial ceremonies held on February 24, 1937, at the École supérieure d'Électricité, de Broglie (representing the French Academy of Sciences) expressed the feelings of Janet's colleagues:

"Sa carrière, sa vie de savant original et profond, de professeur incomparable, d'organisateur et d'animateur capable de créer de

toutes pièces l'enseignement technique de l'électricité et de le porter, par son effort ininterrompu, au point où vous le voyez aujourd'hui, tout cela fut consacré par des honneurs qu'il méritait hautement et qu'il ne recherchait pas. Mais ce qui fait peut-être le principal mérite de Paul JANET c'est d'avoir allié à la culture générale la plus étendue et la plus profonde, toutes les qualités de méthode, de discernement, de connaissance de la nature des choses et de l'esprit des hommes qui sont nécessaires pour passer de la science pure et abstraite aux applications si prodigieusement variées qui constituent aujourd'hui le domaine de l'électricité industrielle."

DUGALD C. JACKSON

FRANK ARTHUR LAWS (1867-1936)

Fellow in Class I, Section 2, 1897

Frank Arthur Laws was born in Brockton, Massachusetts, of old New England stock, on May 28, 1867. He died in Brookline on November 12, 1936.

His boyhood was spent entirely in Brockton, where he attended the public schools, and he graduated from the Massachusetts Institute of Technology in 1889 in the electrical engineering course and later attended courses at Harvard University. From 1889 until his retirement from active teaching as Professor Emeritus in 1932, he served continuously on the staff at the Massachusetts Institute of Technology. His chief professional interest was in the field of electrical measurements, but he had a keen grasp of many aspects of electrical engineering. He was responsible for the development of the course in electrical measurements and of the technical electrical measurements laboratory at the Institute. He was an excellent teacher and had a real personal interest in his students.

Professor Laws was retained for a number of years by the Massachusetts Gas and Electric Commission and also did special work in the field of electrical measurements for the Edison Electric Illuminating Company of Boston, the General Electric Company, and other electric light and power companies in New England. He was the author of many technical papers dealing with electrical measurements and his book on that subject was outstanding. A complete revision of this book had just been completed at the time of his death.

Professor Laws married Harriet P. Burbank of Salem, Massachusetts, in 1901 and their home was always a place of cheer and friendliness. They were both interested in young people, and many students and younger members of the staff, especially through the later years, remember with pleasure his kindness and the warm welcome they always received at his home.

He was a fellow of the American Academy of Arts and Sciences and of the American Institute of Electrical Engineers, and served on the committees of the latter on standardization and electrical instruments and measurements. He was also a member of the Society for the Promotion of Engineering Education and of the University Club of Boston.

RALPH R. LAWRENCE

HENRI LECHATelier (1850-1936)

Foreign Honorary Member in Class 1, Section 3, 1919

Henri LeChatelier was born in Paris, October 8, 1850, of distinguished ancestry. His father, Louis LeChatelier (1815-1873) was a widely known engineer, Inspector-General of Mines for France, one of the creators of the French National Railways, and, with Sir William Siemens, builder of the first open-hearth steel furnace. His mother, Elizabeth Durand, was descended from a family of artists and geographers.

LeChatelier was educated exclusively in Paris, first at the Collège Rollin where he received the degree of Bachelor of Letters in 1867 and that of Bachelor of Science in 1868. He then entered the École Polytechnique where his father had been before him, but his work was interrupted by the War of 1870 during which he participated in the defense of Paris. He re-enrolled as a mining engineer in 1872 and received his license to teach physical science in 1874.

For several years thereafter LeChatelier served as geographer in South Algiers, returning to Paris in 1877 to spend there the remainder of his life. He became Professor at the École des Mines in that year, Lecturer at the École Polytechnique in 1882, Professor at the Collège de France in 1883 and Professor of Industrial Chemistry and Metallurgy at the École des Mines in 1887. In 1898 he returned to the Collège de France as Professor of General Chemistry of the Faculty

of Science of Paris, which title he held until he was made Honorary Professor in 1925.

LeChatelier was a profound and prolific investigator. His early researches were concerned with the application of thermodynamics to chemistry, and they yielded results not only of great theoretical, but also of great practical value. For instance, his principle of mobile equilibrium is recognized as of fundamental importance to our understanding of all physico-chemical equilibria, while his studies of the synthesis of ammonia from its elements, in 1901, laid the foundations upon which Haber and Bosch reared a great chemical industry. His later researches, set forth in some five hundred published articles and books, cover a wide field, although they may perhaps all be classified as physico-chemical. They comprise studies of: gaseous equilibria; solutions; the allotropy of the elements, particularly carbon, silicon and the metals; explosives; the utilization of fuels; metallurgy and metallography, particularly as applied to steel; clays, silica and the silicates; cements and mortars; the measurement of high temperatures.

LeChatelier, in his later life, occupied a commanding position in chemical science. He was called upon to serve as a member or chairman of a great many committees and commissions concerned with the application of science to industry and public welfare. In 1907 he was elected to membership in the French Academy of Sciences, succeeding Henri Moissan; in 1927 he was made Grand Officer of the Legion of Honor. He received many similar decorations and many prizes and awards from foreign countries, among which may be particularly mentioned the Grand Prize of the International Exposition at St. Louis in 1904 and the Davy Medal of the Royal Society of London in 1916. He was an honorary member of many scientific and learned societies, both in France and abroad.

LeChatelier was a brilliant exponent of the best traditions of French science. His intellect was clear, powerful, and disciplined. His interests were broad, his activity extraordinary, his ideals high and exacting. During his youth modern physical chemistry was beginning its phenomenal development; he became one of its great protagonists.

LeChatelier died of angina pectoris on September 17, 1936, at his country estate, Miribel-les-échelles (Isère), France, in his eighty-sixth year.

ARTHUR B. LAMB

PAUL ELMER MORE (1864-1937)

Fellow in Class IV, Section 1, 1931

Paul Elmer More, editor and critic, was born in St. Louis, Missouri, December 12, 1864. His parents, Enoch Anson and Katherine Hay Elmer, were of Colonial stock. The father at one time or another pursued trades as different as bookseller and wholesale grocer. He enlisted in the line in the Civil War, and was mustered out as a Commissary Brigadier General.

The prosperity of the family was intermittent, and Paul met the situation by teaching school for three years on the way to the university. Graduating from Washington University in 1887, he took his master's degree there in 1892, and added to it a Harvard M.A. in 1893. Later honorary degrees were, LL.D. from Glasgow and Litt.D. from Columbia and Dartmouth. His graduate studies at Harvard were in Sanskrit and Pali under Professor Lanman. A brilliant fellow student, Irving Babbitt, was already planning a campaign for a new humanism in which Paul More was to share. For two years, 1894 and 1895, Paul More was an assistant in Sanskrit at Harvard, for the years 1895 to 1897 an associate in Sanskrit and Classical Literature at Bryn Mawr. Then, apparently well launched on an academic career and affianced to the young woman who became his wife, he withdrew to a cabin near Shelburne, New Hampshire, where he passed two years in meditation and in writing. One may surmise that a shrewd intuition of the incompatibility of teaching with his literary ambitions played some part in this retreat.

He had already given gages to literature. In 1890 appeared from the press of the Putnams a thin volume, "Helena and Occasional Poems." Its value today is not much more than that of proving that the proverbially austere critic had been a very susceptible young man. "The Great Refusal, Being Letters of a Dreamer in Gotham," New York, 1894, was a more serious matter. Ostensibly the editor, Paul More was really the author of this strange collection of love letters to a beautiful woman. Like Dante, Paul More embodied in the beauty and loveliness of a fair woman all his own idealisms. The book is in its own fashion a modern "Vita Nuova," and does not deserve the oblivion that has fallen upon it. "The Great Refusal" has the further interest of showing a soul profoundly disquieted in an agnostic position, and likely to seek ultimate refuge in religion.

Within a year of the publication of "The Great Refusal" Paul More was happily engaged to Miss Henrietta Beck, of St. Louis. They were both poor, and the long engagement was at least varied and punctuated by the two hermit years at Shelburne. These were fruitful years. In 1898 appeared his most notable book of verse, "A Century of Indian Epigrams chiefly from the Sanskrit of Bhartrihari." The austere and sententious mood of these aphorisms found a congenial interpreter.

Besides these admirable translations, were written a handful of remarkable critical essays for *The Atlantic Monthly* and other magazines.

In 1900 or a little earlier, at thirty-six, Paul More left the Shelburne cabin with an established reputation as a critic, and even with a little money in the bank. On these assets he married and settled at East Orange, New Jersey, as a free-lance critic. That way lay indigency, for such essays as had been eagerly accepted now came back. A critic to print must have his own organ. So it was a happy choice, though doubtless a forced one, when in 1901, Paul More fell back on the literary editorship of *The Independent*. He built up an already strong review department and adorned it with his own essays.

In 1903 he was called to be literary editor of *The New York Evening Post*. He conducted this new enterprise with characteristic thoroughness and energy and contributed many of his most distinguished essays to the *Post's* Literary Supplement.

In 1903 he published the first volume of "Shelburne Essays." These books were to follow in stately succession until 1921 and the eleventh series, constituting the most substantial body of literary criticism written in the English language in our own times. From his earlier essays he chose for the first volume writers who raised broad moral issues,—Thoreau, Emerson, Hawthorne, Carlyle, Tolstoy. But he also dealt sensitively with such contemporary minor writers as Arthur Symons, Lady Gregory, the Irish poets. In a final essay on "The Religious Ground of Humanitarianism" he expounded those morals of dualism which soon made him a leader in the humanist movement.

The remaining ten volumes of "Shelburne Essays" must be characterized in the most general terms. Most of them were published in *The Evening Post* and *Nation*, as journalistic occasion suggested—

anniversaries, the appearance of new editions or biographies. Preferably he dealt with the most serious authors, but he also treated minor figures with perceptiveness, urbanity, and charm. They seemed to disarm the severe moralist in him. Through all these volumes the uniting thread was his moral philosophy of dualism. The eighth series, 1915, presented "Definitions in Dualism," the ultimate expression of his ultimate position as a secular moralist—a position essentially Platonic. The ninth series, "Aristocracy and Justice," treated political and moral issues in an ultraconservative spirit. For me these are Paul More's least satisfactory essays.

What one felt through the hundred or more "Shelburne Essays" was a critic in the tradition of Matthew Arnold, with English and European literature at his easy command, thoroughly versed in the classics and commanding uniquely among critics writing English an intimate knowledge of the sacred books of India. And this richness of erudition Paul More carried with ease; his scholarship was free from pedantry.

His editorship of *The Nation* ended stormily in 1914 at the stormy beginnings of the World War. He retired to Princeton, where the University for many years enlisted him as a lecturer, chiefly to graduate students, on Greek philosophy. An opportune legacy to his wife made his material situation one of ease, while the spiritual *malaise* which is ever evident in his works was driving him back to Christianity.

The remaining twenty years of his life were devoted to working out his own sort of Christianity. It stood on two legs,—the Platonic Idealism and the Incarnation, as making it personal, living and available. A mere enumeration of titles may sufficiently suggest the development of a familiar theme to which he lent a singular novelty, eloquence and persuasiveness: Platonism (1917), The Religion of Plato (1921), Hellenistic Philosophies (1923), The Christ of the New Testament (1924.), Christ the Word (1927), The Catholic Faith (1931). Throughout the familiar analysis of Greek philosophy and ethics, and equally in that of Christian theology and heresy, he made the ways of thinking come alive and assume present importance, for he proved that they were still our ways of facing the issues of life, and pregnant with good will for us. He finally found rest in a faith which embraced a God limited by an ineluctable principle of disorder, the

Incarnation (which he resolutely declined to define), some sort of a resurrection and immortality. An enemy of all dogmatisms, and equally of all mysticisms, he associated himself with the Anglo-Catholic Church. He felt a deep human wisdom in its genius for working compromises. His last considerable literary task was the editing, with F. L. Cross, of an anthology of sixteenth and seventeenth century divinity, "Anglicanism" (1935).

Whoever lacks courage to traverse the theological *Mare Magnum* of the eight volumes devoted to Paul More's religion may find the gist of it in "The Sceptical Approach to Religion," 1934. Incidentally he will read Paul More's greatest book—for me the most eloquent and substantial survey of Christian belief and polity since Bossuet's "Discourse on Universal History."

In this religious development probably the influence of his wife counted for much. An ideal helpmate for a man of letters, tempering the high seriousness of her gifted husband always with her humor, and at times with her mockery, she also was a woman of natural, beautiful, and intuitive piety. She died in 1928. Two daughters, Mary Darrah More (Fine), and Alice More (Dimand), followed the family tradition by marrying scholars.

In 1931 Paul More started a new series of "Shelburne Essays," in smaller compass and format, with "The Demon of the Absolute." In it he attacked all absolutisms standing on a sort of probabilism not unlike that of Butler and Paley, but enriching it greatly from Platonic and Hindu precedents. The next volume was "The Sceptical Approach to Religion," 1934. The third volume of "New Shelburne Essays," "On Being Human," contained articles on humanism, which had become a minor interest with him, on its backer, Irving Babbitt, on Proust, James Joyce, and modernistic French Poetry. But in all "New Shelburne Essays" the interest in literary criticism as such is subordinate to morals.

Such considerations suggest the paradox that a man whose allegiance to literary criticism was perhaps always half-hearted after all made himself a literary critic of the first order. But Paul More could do nothing unthoroughly. His amazing reading, his careful and systematic note taking, his amassing of a kind of literary capital in beautifully filed notes, his scrupulous care in preparation and revision of copy—all this might seem exemplary to that professorial *Deutschtum* which he heartily deplored.

In the travail of his great work on theology he neglected too long the early symptoms of the malignant disease which had carried off his wife. A drastic operation in the early summer of 1935 prolonged his life for nearly two years, but on terms of extreme physical debility. His mind rose above this, and as he wasted away in his bed he continued to write and revise his older writings. "An Oxford Diary," a personal confession of faith, was prepared for press during these months and finished only a few days before his death. On March 9, 1937, he passed away in his seventy-third year.

Personally he was equally free from vanity and self-depreciation. His manners were both affable and reserved. Ultimate convictions, perhaps ultimate prejudices also, he maintained inflexibly, but defensively rather than aggressively. In short, one may say that in life and in letters he exemplified all the merits and graces of an enlightened Toryism. In our day such an attitude at least has high scarcity value. It was the uniqueness and integrity of his conservatism that made for Paul More many enemies, and makes his loss irreparable for his friends.

FRANK JEWETT MATHER, JR.

HARRY WHEELER MORSE (1873-1936)

Fellow in Class I, Section 2, 1911

Harry Wheeler Morse was born at San Diego, California, February 25, 1873, son of Philip and Sarah (McDonald) Morse. He graduated from Leland Stanford Jr. University with the A.B. degree in 1897. He entered the University of Leipzig in 1899 and studied Physical Chemistry with Professor Wilhelm Ostwald and Professor Robert Luther, obtaining a Ph.D. degree in 1901. From 1900 to 1902 he was assistant in Ostwald's laboratory at Leipzig. At that time a large group of American, English, and Russian, as well as German, students of physical chemistry were resident at Leipzig and were eagerly and enthusiastically pursuing their studies and researches in Ostwald's crowded laboratories. Morse, as assistant to Ostwald and Luther, genially and ably aided in the direction of the laboratory *Praktikum* and in the orientation of students in their researches. He also contributed largely to the publication of a revision of Ostwald's *Handbuch*

and assisted with the work of editing the *Zeitschrift für physikalische Chemie*.

In 1902 Morse was called to Harvard as Instructor in Physics for the purpose of embodying in the instruction at the Jefferson Physical Laboratory at Harvard some of the physical material newly arrived at through the vigorous progress that had been made in physical chemistry. In addition to aiding in elementary laboratory instruction, Morse gave lectures at Harvard on photography, electrolytic conduction, and storage batteries; and in his researches made important contributions to these subjects and to the subjects of electrolytic condensers, chemical diffusion, fluorescence, colloidal processes, evaporation, and crystallography. On August 8, 1904, he married Isabel Grace Gray of Ayr, Scotland.

In 1910, after serving eight years as instructor, he was made Assistant Professor of Physics at Harvard. This position he resigned in 1912 to become Professor of Chemistry at the University of California.

Morse was a man of great diversity of scientific interests as shown by his holding successively two important professorships, one in Physics and one in Chemistry. In both of these subjects he was a brilliant lecturer and able investigator.

In 1913 Morse became interested in the inventions of Cottrell for the precipitation of smoke and the recovery of minerals from the flue gases of smelters, resigned his professorship at California, and from 1913 to 1918 he was in charge of the scientific work of the Western Precipitation Company and at the same time was technical manager of the American Trona Corporation. From 1920 to his death he was a consulting chemist and metallurgist, and made many important contributions to metallurgy and mining.

His publications included a translation into English of Ostwald's *Letters to a Painter on the Theory and Practice of Painting*, 1906, and of Ostwald's *Fundamental Principles of Chemistry*, 1907. He was joint author with Ostwald of *Ostwald and Morse's Elementary Modern Chemistry*, 1907, and author of *Chemistry and Physics of the Lead Accumulator*, 1912. He also published a number of monographs on spectroscopy, fluorescence, diffusion, electrochemistry, metallurgy, and geological chemistry.

He was a Fellow of the American Academy of Arts and Sciences,

Member American Institute of Mining and Metallurgical Engineers, American Chemical Society, American Institute of Chemical Engineers, Sigma Chi, and of the Players' Club of New York.

He died at his home at Stanford University, California, March 16, 1936, and is survived by his widow, Isabel Gray Morse, and their four children, Philip Gray, Cecily, Constance, and Anthony John.

He was a scholar of wide interests, a careful and fluent writer, an able and enthusiastic investigator, a genial companion, and staunch friend.

GEORGE W. PIERCE

EDWARD LEAMINGTON NICHOLS (1854-1937)

Fellow in Class I, Section 2, 1901

Edward Leamington Nichols was born in Leamington, England, on September 14, 1854, of American parents. After his graduation at Cornell in 1875 he studied at the universities of Leipzig, Berlin, and Göttingen; from the latter university he received the degree of doctor of philosophy in 1879. During the year 1879-80 he held a fellowship in the Johns Hopkins University and in the following year was one of the assistants of Edison in the famous Menlo Park Laboratory. His first teaching position was that of professor of physics and chemistry in Central University, Kentucky, where he remained for two years. In 1883 he went to the University of Kansas as professor of Physics and Astronomy and in 1887 returned to Cornell, where he remained as head of the department of physics until his retirement from teaching in 1919. He died in West Palm Beach, Florida, on November 10, 1937.

Nichols was a firm believer in the value of scientific research to humanity and contributed through his work as an experimental physicist to almost every branch of the physics of his day. His chief interest, however, was in problems connected with light. His activity as an investigator began while he was still a student and extended to within only a few years of his death. Neither lack of facilities nor pressure of other duties could lessen his interest or greatly reduce his activity. During his first two years as a teacher, located in the mountains of Kentucky many miles from a railroad and with no facilities whatever for experimental work, he nevertheless carried on a difficult investigation on the undercooling of vapors and compressed gases. And his experimental work on luminescence continued with-

out interruption even when he was carrying a double load of responsibility as head of the department of physics and at the same time dean of the college of Arts and Sciences.

While in Kansas, and for a number of years thereafter, his work was largely in the fields of physiological optics and illumination. Undoubtedly his interest in these lines of work had been greatly stimulated by his contact with Edison during the early development period of the incandescent lamp. His important work in this field led to his election as the second honorary member of the Illuminating Engineering Society, Edison being the first. For the last thirty years he had devoted himself to the experimental study of the luminescence of solids and liquids. His work in this field received support from the Carnegie Institution of Washington, of which he was for many years a research associate. In recognition of his work in these fields, in each of which he was a pioneer, he was awarded the Elliott Cresson Medal of the Franklin Institute, the Ives Medal of the Optical Society, and the Rumford Medal of the American Academy (1928) and was made an honorary member of the Illuminating Engineering Society and of the American Optical Society.

Nichols' work as an investigator represents only one part of his service to American physics. In many other ways his stimulating influence has been important and far reaching.

Aside from his own research work his most outstanding contribution to American physics was the establishment of the *Physical Review* in 1893. Previous to that time there was no journal in this country devoted exclusively—or even primarily—to physics and the need of more adequate provision for publication had been keenly felt. With the financial support of Cornell University, Nichols established such a journal six years before the American Physical Society was organized and when the number of active physicists in this country was far too small to make any cooperative plan of publication practicable. He remained editor-in-chief of the *Physical Review* until it had become self-supporting and then transferred control of the Journal to the Physical Society.

To estimate the importance of Nichols' service to American Physics we must recall the conditions in this country at the time he began his scientific career in 1880. There was no general interest in physics, or in science generally, and very little appreciation of the importance of

scientific work. Very few universities were equipped for anything more than undergraduate instruction in the sciences; and in the minds of many there existed a feeling that scientific investigation was hardly a proper function of the college teacher. Not only was there no journal of physics for the publication of results but except for the annual meeting of the American Association for the Advancement of Science there was no opportunity for physicists to get together for discussion. Even when conditions otherwise were favorable it was almost impossible to obtain financial support for scientific work.

Nichols contributed more than any other physicist of his generation to change this situation and to prepare the way for the remarkable scientific progress of recent years. Almost as important as his establishment of the *Physical Review* was the inspiration of his enthusiasm and untiring scientific activity. He was one of the small group that organized the American Physical Society in 1899 and later one of the society's most active members. As president of the Physical Society, of Sigma Xi, and of the American Association for the Advancement of Science he kept continually before the public the importance of scientific work. His influence was exerted even more effectively through his students. Shortly before the time of his retirement the heads of the departments of physics in thirty-five colleges in this country and in Canada, fifteen of them state universities, were men who had received their physics training from him and with it his firm belief in the value of scientific research and some measure of his enthusiasm.

For one who was as successful as he in a special field Nichols's interests and information extended over a surprisingly wide range. He was by no means a narrow specialist. Undoubtedly this breadth of knowledge and interest was an important factor in making him so successful as a teacher. He was an enthusiastic traveler and, although his sabbatical leave was usually spent in Europe, had visited at some time each of the six continents. A sincere and active church member, Nichols saw no conflict between science and religion, but merely two different aspects of that search for truth to which his life had been devoted. He will be held in affectionate remembrance by all who knew him, but especially by those of us who as his students and associates received encouragement and inspiration from his life work.

ERNEST G. MERRITT.

HENRY FAIRFIELD OSBORN (1857-1935)

Fellow in Class II, Section 3, 1901

Professor Osborn will be remembered for the unprecedented development of the American Museum of Natural History during his forty-five years association with it and for his researches in and popularization of biology, vertebrate paleontology and evolution.

He was born August 8, 1857 at Fairfield, Connecticut, son of William Henry Osborn and Virginia Reed (Sturges) Osborn. He died suddenly of heart failure at his home in Garrison-on-Hudson, New York, on November 6, 1935 at the age of seventy-eight.

He received an A.B. degree from Princeton in 1877. As an undergraduate he had become interested in paleontology and so in 1877 with his school friend, W. B. Scott (now Professor Emeritus of Paleontology at Princeton University) and Francis Speir, Jr. he organized an expedition to explore the Bridger Basin of Wyoming. They brought back to Princeton University many new Eocene mammals.

From 1878 to 1880 he was a graduate student at Princeton University. One year of this time he spent in England where he studied embryology under Balfour and comparative anatomy under Thomas Huxley. He received the Sc.D. degree from Princeton in 1880 and remained as instructor in comparative anatomy from 1881 to 1890. In 1890 he accepted the DaCosta Professorship of Zoology at Columbia University and at the same time became the Curator of the newly established Department of Vertebrate Paleontology in the American Museum of Natural History. In 1903 he began to transfer to the American Museum the greater part of the lectures and laboratory work of his graduate courses in "Evolution of the Vertebrates" and "Mammals Living and Fossil." He ceased his regular teaching work at Columbia in 1910.

In 1895 he acquired for the American Museum the large private collection of fossil vertebrates which had been amassed by Professor E. D. Cope of Philadelphia. This contained many of Cope's types. Then under the vigorous and efficient direction of Professor Osborn, the Department of Vertebrate Paleontology began the great series of field explorations for fossil vertebrates which has never ceased to this day.

Upon the death of Mr. Jessup in 1908 he was elected President of

the Board of Trustees of the American Museum. This necessitated a curtailment of some of his other activities and he turned over his teaching to his assistant, Professor William K. Gregory, who still continues it most successfully. During this period of his able leadership many buildings were added to the Museum in response to the ever growing pressure of the collections and exhibits. Doctor Osborn became Honorary President in 1933.

During his presidency the endowment of the Museum increased from two million dollars to over fourteen million. The Museum membership increased over 400 per cent. The scientific staff was more than trebled. The earth was dotted with expeditions sent out by the Museum and priceless collections were brought back. Very numerous publications, scientific and popular, were issued and given world wide distribution. The artistic standard and effectiveness of the Museum exhibits were vastly improved in their power to attract attention and convey information. Doctor Osborn regarded the Museum as an educational force of supreme importance in acquainting mankind with the nature of his environment.

Personally, he was optimistic, sincere, and extremely helpful, especially to young students. He had a fertile mind, a broad vision, and tenacious purpose. He constantly respected the rights of his colleagues and students to differ with him in the interpretation of scientific problems. The writer well remembers when, as his teacher, Doctor Osborn deeply apologized to him for adding a summarizing sentence to an article without being able to consult him before it went to the press.

In his teaching and writing he repeatedly emphasized the importance of combining breadth of knowledge and interest with intensive specialization, if science were to avoid a narrow, unimaginative submergence in the mere accumulation of fact and on the other hand were to escape a shallow and superficial veneer of pseudoknowledge. He insisted on the supreme importance of the creative element in science and education.

Evolution was to him a continuous creation of life fitted to a continuously changing world. He frequently summed up the meaning of evolution in the following statement: "The moral principle inherent in evolution is that nothing can be gained in this world without an effort; the ethical principle inherent in evolution is that only the best

has the right to survive; the spiritual principle in evolution is the evidence of beauty of order and of design in the daily myriad of miracles to which we owe our existence."

At Princeton in 1876 young Osborn came under the influence of President McCosh who unlike many of his generation taught that the views of Darwin were not incompatible with Christian theology and that evolution seemed to be the method which God had followed in creating the world. He thus started his scientific career with no sense of an irreconcilable conflict with his outlook as a scientist and his faith as a Christian. He was a life long communicant and church-goer.

Doctor Osborn was the author of 940 articles, books and monographs. Among his more important contributions were his monographs on the Mesozoic mammals, the fossil rhinoceroses, the titanothere, and proboscideans. His books include "From the Greeks to Darwin," "The Age of Mammals," "Origin and Evolution of Life" and "Men of the Old Stone Age." He made many contributions to the study of the evolution of the mammalian molar teeth from their bond with tritubercular type, and also to adaptive radiation, especially in mammals.

Doctor Osborn's contributions to science were recognized here and abroad. He was an honorary fellow of a long series of distinguished societies in Europe, Asia, and America. He was an active member of the National Academy of Sciences. In 1928 he was President of the American Association for the Advancement of Science. Among the many awards received in recognition of his scientific labors were the Darwin medal of the Royal Society of London, the Wollaston medal of the Geological Society of London, the medal of the Pasteur Institute of Paris, and the Prix Albert Gaudry of the Geological Society of France.

HERVEY W. SHIMER.

MICHAEL IDVORSKY PUPIN (1858-1935)

Fellow in Class I, Section 2, 1905

Michael Pupin lived a life of fruitful activity for seventy-seven years. He earned distinction in mathematical physics and electrical communications. He had a strong taste for invention in the field of

applied electricity because of its service to humanity, and here he likewise earned distinction. Moreover, he was a philosopher and a romantic. Indeed, he was, himself, a romance.

He was born of peasant parents on October 4, 1858, at Idvor, a village of peasants in the Banat province of old Austria, which was peopled by Serbs; and his parents were of the Serbian race like their neighbors. These people of the Banat were mostly illiterate (in the sense of being unable to read and write) but were full of biblical interpretations, folk-tales, Serbian ballads, and warrior's stories. Young Pupin spent his early years in this peasant setting. His youthful mind was also filled with speculative activity aroused by the stimulating view of wide agricultural lands by day and brilliant stars by night, which views seem to have exerted a deep influence on his mind even while he performed the conventional physical labors of the life of a peasant boy in the pastures and vineyards of the Banat. He never lost from his life the sense of a deep, spiritual philosophy which was implanted in those days. Also, at the instance of an uncommonly sympathetic and wise mother, though herself without formal schooling, he secured the schooling available near home and then attended school at Prague until he was sixteen years of age.

The repressive and narrow outlook in his home land for an ambitious and romantic boy of mental and physical vigor turned his mind and then his being toward America, the land of Benjamin Franklin and Abraham Lincoln. He started for the United States in March, 1874, on his lone responsibility; and he arrived on Manhattan Island, according to his autobiography, possessing only a Turkish fez, the clothing which he was wearing, and five cents in money. He had made the cold and stormy ocean crossing in March without even possessing mattress or bedding for his steerage bunk. He had no relatives nor acquaintances in America and he confessed to the immigration authorities that his knowledge of our nation consisted of little more than the names and some traditions of Franklin, Lincoln, and Harriet Beecher Stowe.

Fortunately admitted to the United States under the then existing liberal immigration laws, he sought for work. The country was still in the clutch of the great depression of the seventies, and work was not plentiful; but, through farm work in Delaware, Maryland, and New Jersey, and odd jobs in New York City and Brooklyn, he made

his way through hardships which only one of great physical endurance and mental purposefulness could have sustained. Happily, he fell in with people in lowly walks of life who advised him well. His reading was of the great American patriots, and his contacts widened until he was given all-round encouragement to prepare for college. In 1879, the fifth year after arriving in this country, he passed entrance examinations for Columbia University with a high record which admitted him to the University free of tuition fees. In college he became equally noted among his classmates for scholarship in mathematics and Greek, and for prowess in wrestling and boxing. He was "class president" in his junior year. Thereafter his personal qualities, physical vigor, grasp in learning, sound enthusiasm for mental and physical activity of helpful character, and readiness in friendships with interesting people carried him forward throughout his always interesting and ultimately distinguished career. He had a genius for friendship with people of intellectual quality and guiding spiritual influence. To his great joy he became a naturalized American citizen the day before his graduation into the Bachelor of Arts degree at Columbia in June, 1883.

Pupin now possessed a fair acquaintance with the classics and mathematics; but his ambition had become set on science, and particularly on electromagnetism as developed by the works of Faraday and Maxwell. His scholarship at Columbia rated him support for further study, and he sailed for Europe to visit his old mother at Idvor for the first time since his departure for school at Prague; and then to enter Cambridge University (England) to study under the spirits of Newton and Maxwell. Maxwell had been dead for some four years, and neither Lord Rayleigh nor J. J. Thomson (who succeeded to physics in the University) were Maxwell devotees. This was a disappointment to Pupin, but he remained at Cambridge until 1885, concentrating his study on mathematics, although apparently reading much regarding Faraday, Maxwell, and La Grange. In one summer he learned French because "The names of Laplace, La Grange, and Ampère were mentioned so often and with so much veneration by Maxwell that I felt ashamed of my ignorance of the language of France," and then, feeling "enriched by a good knowledge of a great civilization," he read La Grange's *Mécanique Analytique* in the original.

Attracted by the reputation of Helmholtz in experimental physics, he migrated to the University of Berlin to study under that master. He was the first holder of a Tyndall Fellowship of Columbia University. It was here that he absorbed with his usual concentration, Helmholtz's notable interpretations of the Maxwellian theories. While thus a student still in Berlin, he heard in the latter part of 1887 an announcement by Helmholtz of Hertz's experimental verification of Maxwell's theory of electrical waves in space, and a eulogy of Hertz who had been a student of Helmholtz. Early in 1889 he received from the University of Berlin the Ph.D. degree for his work with Helmholtz, which was crowned by a mathematical research and thesis in physical chemistry—a field in which Helmholtz took great interest at the time.

It was in 1888 that Pupin became engaged to Sarah Katharine Jackson, sister of one of his Columbia classmates then also studying in Europe. A beautiful example of his purposeful tenacity lies in his following the girl from place to place in Europe, as she moved about with her mother for visiting and sight-seeing, until she accepted his suit; whereupon he hastened to New York to try to secure a job. Happily that was to be had promptly as "Teacher of Mathematical Physics in the Department of Electrical Engineering" of Columbia University. Thereupon, returning to Europe, he was married in London and returned to Berlin to finish the work for his doctorate.

The autumn of 1889 found him established in his post at Columbia University. Then began his notable creative career in teaching, writing, and inventing. His was an extraordinary influence on students in classroom and laboratory. His five articles published in *Transactions of the American Institute of Electrical Engineers* in the decade 1890-1900 are now historical classics, as likewise are several articles in other fields published in other journals. Of his three books, published for general consumption, his autobiography called "From Immigrant to Inventor" is a contribution to the literature of American life and idealism.

At the time that he assumed his position in the staff of Columbia University the electrical engineering laboratory was meagre in space and meagre in equipment. The physics equipment of the University was not planned for experimental research. However, Pupin started industriously to work with lean and extemporized equipment toward

the answer to various questions fermenting in his mind. This led to inventions relating to oscillating circuits and rectifier devices, at least some of which later proved of value to the Marconi Company when developing its processes of radio communications.

Upon publication of Roentgen's discovery of X-rays, Pupin started to work actively in research relating to their application in surgery, and particularly to methods of X-ray photography. He also independently discovered secondary radiation of X-rays.

His principal invention, however, made in the latter part of the decade of the nineties, was in loading telephone lines with self-inductance in a manner to improve speech transmission. Thus arose the well-known Pupin "loading coils."

It was already known that addition of self-inductance in overhead telephone circuits would be helpful. Increasing the distance between outgoing and incoming conductors of a pair composing a telephone circuit had been proposed, but was not physically or economically feasible. Introduction of coils at intervals apparently had been tried but proved without utility. Pupin solved the problem by an intellectual process which is a monument to his mental fertility. He was familiar with the well-known La Grange solution of the equation for a vibrating string loaded with pellets. Having achieved a solution which included the effects of abstracting energy by the drag of a viscous medium, he was impressed by the analogy to conditions of flow of alternating current in an electric circuit where it is desired in the process of transmission to preserve the fidelity of an impressed vibratory wave train. He soon had formulas which displayed specifications for the self-inductance to be provided in coils, and the frequency of the location of the coils, in any telephone circuit of known physical construction and desired performance. Experimental tests of models completely verified his theoretical predetermination. The intellectual process of Pupin,—of conception, use of abstract science for drawing inferences together, and verification by laboratory experiment,—place this invention on the high level occupied by the group of the most beautifully intellectual of American inventions.

At the opening of the twentieth century it was thought that this invention was possibly the reed upon which could lean the economical development of telephony through aerial wires over very long distances. It did aid in that direction. On the advent of the triode

vacuum tube and vacuum tube telephone repeaters, they usurped that field, but the Pupin loading coil still holds an important place in many aspects of telephone plant.

At the time of retiring from his active position in Columbia University to become Emeritus Professor, with the intention of continuing in active research, his title was Professor of Electromechanics. This was in 1929. His health was not good in the latter years of his life. He died on March 12, 1935.

He was active in organized affairs relating to science, throughout his life. He became a member of the American Institute of Electrical Engineers in 1890, was its President in 1925-26, and was an Honorary Member at his death. He was a charter member of the American Physical Society, which was organized in 1899, and was a member of the American Mathematical Society. He was President of the Institute of Radio Engineers in 1916 and President of the American Association for the Advancement of Science in 1926. He was Chairman of the Engineering Foundation for a period after the United States entered the World War, was instrumental in the aid which that Foundation gave to the establishment of the National Research Council, and for a time he participated actively in the work of the latter. He was a member of the National Academy of Sciences and the American Philosophical Society, besides other scientific societies at home and abroad. He became a Fellow of the American Academy of Arts and Sciences in 1905.

He is reputed to have received as many as eighteen honorary degrees from educational institutions. His inventions and their service to mankind brought him many medals. In 1902 he received the Elliot Cresson Medal of the Franklin Institute; in 1916 the Prix Hébert of the French Academy of Sciences; in 1920 the Edison Medal of the American Institute of Electrical Engineers and the Gold Medal of the National Institute of Social Sciences; in 1924 the Medal of Honor of the Institute of Radio Engineers; in 1928 the Washington Award of the Western Society of Engineers and the Four Founder Engineering Societies; in 1932 the John Fritz Medal of the Founder Engineering Societies.

Beginning with 1909, he gave much attention to the welfare of Serbian immigrants in this country; and he gave aid to Serbia during the World War.

Those who knew Pupin personally will understand how characteristic of his enthusiasm is the remark made in his autobiography relating to his student days in Berlin while he was ruminating on the works of Faraday and Maxwell and their interpretations by Helmholtz: "I do not know how difficult it is to conceal a deep secret, because I never had one to conceal; but I do know how hard it is to keep imprisoned in one's heart the joy which one feels when the light of new knowledge rises above one's mental horizon." The first nine chapters of that autobiography, which bring him to his ultimate academic career, are a contribution to distinguished literature. They can be reread with the same lively interest as may be found in rereading the autobiography of Benjamin Franklin or of John Brashear.

DUGALD C. JACKSON.

ALLAN WINTER ROWE (1879-1934)

Fellow in Class I, Section 3, 1927

The many scientific and social activities of Allan Winter Rowe have been recorded in detail in a number of published articles.¹

This memoir will be limited to a brief account of his life and an appreciation of his scientific work. Dr. Rowe was a cultured gentleman who had many interests outside of his professional life. He was an authority on heraldry and a member of the committee granting heraldic designs in New England. He was an expert on early pewter, medical history of crime, and New England antiques, and was active in the affairs of the Harvard Musical Association. His influence on the development of amateur athletics is recorded in the references which have been given. He served his Alma Mater as a member of its corporation and as president of the Alumni Association of the Massachusetts Institute of Technology.

¹ Allan Winter Rowe—1879-1934—Some Tributes and a Reproduction of the Portrait Presented to M.I.T. by His Friends, The Alumni Association, M.I.T., July, 1935.

Endocrinology, January-February, 1935, page 19.

Industrial and Engineering Chemistry (News Edition), December 20, 1934, page 454.

The Nucleus, of the Northeastern Section of the American Chemical Society, February 1935, page 101.

The Technology Review, January, 1935, page 140.

Bostonia, January, 1935.

Allan Winter Rowe was born in Gloucester, Massachusetts on July 31, 1879, and died in Boston on December 6, 1934. He was awarded the degree of Bachelor of Science in Chemical Engineering by the Massachusetts Institute of Technology in 1901. After a year in industry he was appointed an assistant in chemistry at Wesleyan University where he carried out research with Professor W. O. Atwater and won the degree of Master of Science in 1904. He was granted a fellowship by the Massachusetts Institute of Technology and after two years at the University of Göttingen was awarded the degree of Doctor of Philosophy in physical chemistry. He was appointed special lecturer in the Boston University School of Medicine, and in 1908 was promoted to a professorship. During the period between 1908 to 1914, he found time to continue his research in physical chemistry at Harvard University, in collaboration with Professor T. W. Richards. In 1910 when the Evans Memorial Hospital of Boston University was organized for clinical research and preventive medicine, Dr. Rowe became a member of its research staff. In 1921 he was chosen as Director of Research and continued in that position until his death. Dr. Rowe did not have the degree of Doctor of Medicine; his appointment to such an important position was unusual and evidence of the recognition of the value of his work in the field of medicine. The experience gained by Dr. Rowe in his researches in physical chemistry gave him a point of view which is seen in all his work in physiological chemistry. His analysis of the factors involved in his experiments, recognition of causes for errors, quantitative point of view, and his ability to interpret data in a scientific manner led to definite conclusions in a very difficult field of research.

Dr. Rowe's most significant work was in endocrinology. Just before his death he announced that sterility was cured in a significant proportion of human beings by giving to one or the other parent an endocrine gland preparation to make up for hormone deficit. For twenty-five years he devoted himself to the study of the functions of endocrine glands. Much experimental work was devoted to establishing the behavior of the glands in normal health and to developing dependable qualitative and quantitative tests to be used in the diagnosis of disturbed endocrine functions. Dr. Rowe was a pioneer in this field and became a recognized authority. He was a member or

fellow of more than a score of scientific academies or societies in this country and in Europe.

Dr. Rowe was a forceful and attractive speaker. He had a personality that charmed all with whom he came in contact. He was interested in and helped many people, and had many loyal friends.

JAMES F. NORRIS.

JULIUS OSCAR STIEGLITZ (1867-1937)

Fellow in Class I, Section 3, 1914

Julius Oscar Stieglitz, an eminent investigator, teacher, administrator, and an important figure in American chemistry, was born in Hoboken, New Jersey, May 26, 1867, a son of Edward and Hedwig Werner Stieglitz. His father who emigrated to the United States during the middle of the last century served in the Civil War and later became a successful wholesale importer of woollens. Julius was the twin brother of Leopold Stieglitz, a physician, through whose influence he might have acquired his life long love of medical science, and the brother of Alfred Stieglitz, the distinguished artist-photographer, art patron, and editor.

At an early age of 14 Julius was sent with his brother Alfred to Germany to study at the Realgymnasium, Karlsruhe, Baden, where he remained until 1886. It was here that he met and courted Anna Maria Stieffel who became his wife in 1891. After he finished his secondary education at the Realgymnasium, he spent a year studying chemistry at Göttingen and two years at the University of Berlin where he obtained his Ph.D. degree under A. W. Hoffmann. In 1890, when Clark University had attracted J. U. Nef, Arthur Michael, and other leaders in organic chemistry, Stieglitz came back to America and joined Nef at Clark as a postdoctorate scholar. For a short time after this, he worked with Parke, Davis & Co. and when the new University of Chicago was opened in 1892 and Nef was asked to head the chemistry department, Stieglitz was given the position of a docent.

Early in his career at the University of Chicago, Stieglitz must have shown outstanding qualities as a teacher, research worker, and administrator, since we find him rapidly advancing in rank and importance during the first decade of his service. At this time the research spirit at Chicago was very high. Under the leadership and

enthusiastic support of Nef, outstanding contributions to fundamental chemistry were made by Stieglitz, Alexander Smith, Felix Lengfeld, Herbert McCoy, Lauder W. Jones, and their students. It was during this period that Stieglitz made valuable contributions to molecular rearrangements, stereoisomerism of nitrogen compounds, theory of indicators and of color production, positive and negative halogens, and catalysis in organic chemistry. He was a leader in the application of physical chemistry to organic and many of his ideas were frequently backed by precise measurements. With W. A. Noyes he was the pioneer in the development and application of electronic theories to organic chemistry long before the theories of Lewis, Langmuir, and Kossel were announced. All of this early work brought him considerable recognition: a promotion to a full professorship in 1905, a directorship of the analytical laboratories, an invitation to deliver the Hitchcock lectures at the University of California in 1909, and an honorary degree of D.Sc. from Clark University in the same year.

In spite of all these honors Stieglitz's interest in research was unabated. His fondness for medicine in its relation to chemistry was cultivated through his friendship with Dr. John Harper Long and with various members of the medical and biological departments of the University. Early in his career we find him associated with the Council on Pharmacy and Chemistry of the American Medical Association and with the Institute of Medicine of Chicago of which he was President in 1917. He was a member of the Advisory Council of the Otho S. A. Sprague Memorial Institute for over twenty-five years, and a consultant to U. S. Public Health Service for over eighteen years. Some of his later work was on organic substances of medicinal value. These include organic compounds of mercury and arsenic and various hypnotics. However, his greatest service to medicine in its relation to chemistry was done through his addresses and books. In 1924 he was the Dohme lecturer at Johns Hopkins University and, in 1925, his "Chemistry and Recent Progress in Medicine" was published followed, in 1928, by a book which he edited on "Chemistry in Medicine." He thought and preached that "chemistry has found in medicine one of its greatest sources of inspiration."

It is not very often that we find an individual who excels equally as an investigator and as a teacher. Stieglitz excelled in both. His

lectures, which were delivered without notes, were clear, unemotional, dignified, logically organized, and leisurely delivered, and were always supplemented with demonstrations of a few well conceived but never spectacular experiments. He had an intuition for what was significant and what was insignificant, a mark of a great teacher. Although his chosen field was organic chemistry, he developed an excellent course in analytical chemistry and in 1911 he published "The Elements of Qualitative Analysis" in two volumes, a textbook which treated this field for the first time from the point of view of physical chemistry and was destined to become a classic in this branch of chemistry. Being a lucid and convincing expositor, he was one of the faculty leaders chosen to organize an "Orientation Course" for the first year students to help them decide what field to pursue. From this course evolved the "Nature of the World and of Man" published in 1926 to which he contributed Chapter V.

Julius Stieglitz was also a shrewd administrator. In 1912, he was made director of the University Laboratories, and in 1915 succeeded Nef as the chairman of the Department of Chemistry. It was in this capacity that he did his greatest service to American higher education. As a member of the University senate he helped mould its policies; he was a strong advocate of postgraduate education of both sexes and at one time had three women in his own staff. Having been trained in Germany during the most impressionable period of his life, he was in the position to evaluate the higher degrees granted by the American Universities. It was his opinion that just before the World War our Ph.D. degree was equal to that granted by the German universities while after the War it was superior, and after that period never advised students to go abroad for their doctor's degree.

His loyalty to chemistry, and particularly to American chemistry, was great. In 1917, during the most critical period of our country, he was elected president of the American Chemical Society, and in his presidential address delivered in Boston he argued in favor of our chemical independence in dyestuffs, medicinal, and other important chemical products. He appealed to the American people at large to recognize the chemical profession at par with the legal, medical, engineering, and other great professions. However, he greatly feared that the development of our great chemical industries would result in the exodus from our universities of their best investigators. He

felt "that healthy progress in our science is dependent primarily on university men pursuing great lines of original investigation. To take from our universities the choicest of our research men would deprive our young men of that inspiration and fertilization of their minds in the period of their greatest acceptiveness, which early intimate association with great investigators alone can give. To my mind it is clear that if universities would fulfill their highest missions they must remain the seats of the best type of research."

In addition to his early honors, Stieglitz received an honorary degree of Chem.D. from the University of Pittsburgh in 1916, and the Willard Gibbs Medal in 1923. He was a member of the National Academy of Sciences, a Fellow of this Academy, the Washington Academy of Sciences, the American Philosophical Society, Sigma Xi (president 1917-19), American Association for the Advancement of Science (vice-president, Chemistry Section, 1917), member of the American Chemical Society, and of a number of foreign societies, member of the International Commission of Annual Tables of Constants (1914-20), and a trustee of International Critical Tables (1920-33).

Like many of the great chemists of the past, Stieglitz was an indefatigable worker throughout his whole life, and very seldom was known to take long vacations. Due to his shyness and personal sensitiveness, his social contacts, outside of his immediate household, were few although he had many friends. He learned to relax in music, photography and, towards the latter part of his life, in golf. To his colleagues he was loyal, tolerant, cooperative, and kind. To those who sought his wise counsel he was unselfishly generous with his time.

In 1932 he lost his wife Anna and in the following year he retired from departmental duties in order to devote the remaining years of his life to research and to writing for publication the numerous researches which were done under his direction during the latter part of his life. In 1934 he married Mary Meda Rising, a member of his own faculty for many years. Two years later he suffered a heart attack and after five weeks of illness died of pneumonia on the 10th day of January, 1937. He had two children by his first wife, a daughter, Dr. Hedwig Kuhn, and a son, Dr. Edward Julius Stieglitz.

To perpetuate his memory and his high ideals, a number of friends,

former students, and members of the Chicago Section of the American Chemical Society have recently founded the Julius Stieglitz Lecture-ship.

NICHOLAS A. MILAS.

ELIHU THOMSON (1853-1937)

Fellow in Class I, Section 2, 1888

Elihu Thomson was born in Manchester, England, on March 29, 1853, and came to this country as a child when his father's employment brought the family to America to locate in Philadelphia. He was the second in a family of eleven children. He evinced great interest in science from early years. When he was eleven years old, his mother provided him with a book called "The Boy's Own Book" that described scientific phenomena together with illustrations of simple apparatus and experiments. The contents of that book so greatly stirred his imagination that he would refer to the effect even in his later years.

Entering the Central High School in Philadelphia at the earliest admissible age (thirteen years), chemistry and physics proved to be his favorite studies. He graduated in 1870 and was promptly made a member of the school staff, to teach chemistry. From that point started a career of scientific investigation, discovery, and invention that continued unremittingly until the advent of his final illness. In these teaching days he was greatly indebted also to the Franklin Institute, the laboratory and lecture room facilities of which afforded him many opportunities for satisfying his tastes. His death occurred on March 13, 1937, fifty-seven years after he left his post at the Central High School to enlarge his opportunities for discovery and invention and to take a leadership in manufacturing his own inventions.

Competent authority has entitled him a Modern Faraday. There was much of kin in the intellectual qualities of the two men, but their tastes led them along different creative paths. Michael Faraday was possessed with avidity to discover and explain the interrelations of phenomena of nature. Leaving to others the further investigations needed to apply his discoveries in devices of material utility for man, he extended his own researches among phenomena so that his discoveries are fundamental to a wide world of chemistry and physics,

and his name is a word to conjure with in circles where science is cultivated. Elihu Thomson was interested in discovering relations of phenomena, but his avidity (contrary to that of Faraday) was for securing devices of utility for man from applications of his discoveries and also from already known factors in the field of science. Being one who foresaw that (in material comforts) "Change may never change or pass away," to use Swinburne's phrase, Thomson pursued a fertile career primarily in invention, until his name became of world-wide fame in circles of engineering and notably of electrical engineering. His temperament is illustrated by his own words expressed at a commemorative dinner held in 1930, "No greater joy has come to me than the joy of accomplishment. Then, too, I have had the satisfaction of aiding in giving employment to large numbers of intelligent men and women."

Each of these two scientists contributed magnificently to human welfare and happiness, directly or indirectly. Each deserves and has received world acclaim for his achievements. The differences between their tastes and therefore between the scopes of their endeavors makes a more exact comparison impracticable as well as unnecessary.

Elihu Thomson was one of the now rapidly disappearing generation of men who, by discoveries and inventions, wrought electrical engineering out of the early scientific foundations into the aspect of a great contribution to human comfort and happiness; and he was one of the greatest of that remarkable group. His achievements have directly contributed so much to the comfort and thus to the happiness of men that the world owes him an inextinguishable debt.

Thomson was elected a Fellow of this Academy on March 14, 1888, upon nomination of Charles R. Cross, John Trowbridge, and Silas W. Holman, honored professors of physics in Harvard and M.I.T., all now in their graves. Accordant with his custom concerning scientific societies that attracted his interest and affection, he took lively part in Academy affairs, habitually attended the meetings, presented communications in 1900, 1910, 1912, 1919, 1922, 1933, and in 1928 wrote the Memoir of Professor Charles R. Cross, one of his nominators. He was a Member of Council, 1904-1908, Vice President 1908-1923, and Member of the Rumford Committee from 1903 until his death. He was awarded the Rumford Medal in 1901 "for his inventions in electric welding and lighting."

The wide recognition of his work (especially during his later years) is indicated by his scientific society memberships and important medals conferred on him at home and abroad. It is said that no other man has been recipient of all three of the great British medals granted by great engineering and scientific associations. Few have ever received such a distinguished series of medals.

Honorary academic degrees of Ph.D. in 1894, Sc.D. in 1909 and LL.D. in 1924 have been conferred on him respectively by Tufts College, Harvard University and University of Pennsylvania. Victoria University, Manchester, England (his birthplace), conferred on him its degree of Sc.D. in 1924.

The importance of Thomson's work and the extent of its appreciation are well illustrated by the fullness of these various forms of recognition. The magnitude of his work of invention is indicated by the statement that over seven hundred patents have been issued covering inventions which he made. It is not appropriate here to make an enumeration, but those inventions have affected electrical engineering prodigiously. The earliest one of importance (made while he was still in Philadelphia) was the automatically regulating arc-light dynamo with three-coil spherical armature and blow-out arc-extinguisher at the commutator. This had great influence on the development of arc-lighting in the early days of electric lighting service. In the same early days he demonstrated in one experiment the reversibility of induction coils and the process of butt-welding by electric current. His manner of working and the meagreness of knowledge regarding electric circuits in those days are illustrated by a statement of Thomson reported by Dr. C. F. Scott. "The Rhumkorff Coil" (said Thomson) "uses a low-voltage current for producing a very high voltage. I wondered if the process could be reversed and the high-voltage current in the fine winding would produce a current in the heavy winding. I was fearful of the results [i.e. to the coil] and put off experiments until I had a coil of my own. I placed the ends of the heavy terminals close together and observed carefully when the Leyden jars were discharged through the fine wire coil. There was a flash and when I attempted to separate the terminals I found them solidly welded together. That was the beginning of my work in electric welding." These observations contributed later to Professor Thomson establishing the extremely serviceable art of resistance

electric-welding and to his making important inventions in the field of electric transmission of power. Other observations in these Philadelphia days led to additional later important inventions.

When incandescent electric lighting was growing up, the art was at a disadvantage from lack of a simple registering meter comparable in qualities to a gas meter. Thomson's meter filled that gap and won for him the Paris Meter Prize in 1890 besides going into wide use. He produced lightning arresters for electric circuits with magnetic means for causing extinguishment of the sustained arc when the arrester operated in an electric power circuit. That "magnetic blowout" device has become so entwined in electrical engineering that its applications in electric circuits are innumerable. In his electric light and power developments he always gave great concern to the question of safety of the public and of users of the current. He was a leader in this direction of thought.

He early worked in the field of high-frequency currents and in the field of X-rays, with some discoveries and inventions in each, including the production of stereoscopic X-ray pictures. He discovered the repulsion forces caused by the magnetic effects of alternating currents acting on adjoining closed conducting circuits and utilized the phenomena in invented devices. And thus he went through the gamut of electrical affairs that attracted his attention and interest; nor did he wholly neglect the fields of chemistry and mechanical engineering.

He was happily married twice, once in 1884 with the issue of four children, and again in 1923. He had deep interest in children. His long-time and loyal secretary has said that he has frequently seen him "lose himself entirely in preoccupation with children's activities and it was always with great difficulty that we could revive his attention to some important matter, and then only with one eye cast eagerly in the direction of the children." He also was careful of the welfare of the young men who became his assistants, and many men who now are of importance in electrical engineering ascribe much of their success to their early relations with Professor Thomson. The adequacy and smooth sequences of his intellectual processes were always inspiring to young men.

He was devotedly interested in education to the end of his days and his relations with M.I.T. and Harvard University were among his happiest. He became formally a lecturer in electrical engineering at

M.I.T. in 1894 and so continued to the day of his death. He was elected a life member of its Corporation in 1898, was Acting President in 1920-1923 during an interregnum, and of late years was a member of the Executive Committee of the Corporation. From time to time he was member of Visiting Committees of departments such as electrical engineering, physics and other sciences. His devoted service to M.I.T. and also to Harvard as a visitor and adviser, make education in science and engineering his debtor.

In addition to his absorbing professional occupation Professor Thomson took much interest in each new scientific phenomenon that came to his attention. A number of his brief articles published in *Science* or elsewhere related to such matters. He was a happy follower of several scientific avocations, principally as an amateur in astronomy, in music, and in color photography. For the former he built a small observatory on his place in Swampscott, Mass., in which was a modest telescope which he built for himself, even to the grinding of the lenses. He built for himself a pipe organ on which it was his pleasure to perform. And in his later years his wife was his congenial and perfect companion in the joys of color photography.

His personal characteristics were so admirably summed up at the Eightieth Birthday Dinner by Edwin W. Rice, Jr. (at first a student and then a life-long colleague of Thomson, than whom no man knew Thomson so well), that I quote his words: "Throughout his whole career Professor Thomson has exhibited an unerring capacity for the selection of that thing or that process which was soundest and best, and simplicity and directness always characterized his designs. . . . He seems to possess an intuitive insight into nature and her ways; probably because of the quickness and accuracy of his perception, combined with the depth and range of scientific knowledge, helped by a remarkably retentive memory. Difficulties never discourage him, but only stimulate him to greater endeavor. . . . He has been a prolific inventor, a trained engineer and an inspiring teacher. Our generation has produced men who may have equalled or excelled him in some one of these fields, but no one has arisen in the generation who to such a superlative degree combined the quality of inventor, engineer and teacher."

DUGALD C. JACKSON

CHARLES HOWARD WALKER (1857-1936)

Fellow in Class IV, Section 4, 1921

Charles Howard Walker was an architect and an educator. He was born in West Roxbury, January 9, 1857, and died April 12, 1936. His life as an architect began in 1875, when at the age of eighteen he entered the office of Sturgis and Brigham. Opportunities for work and study took him successively to New York in 1879 and in 1881 to Europe and Asia Minor. In 1885 he began the practice of architecture under his own name, later taking in Thomas Kimball as a partner. This partnership ended in 1899 after the Omaha Exposition for which the firm of Walker and Kimball were architects-in-chief. He practiced alone until 1911 when he took his son, Harold D. Walker, into the firm under the name of C. Howard Walker and Son. In 1925 the firm name became Walker and Walker and Kingsbury and in 1930 it was changed to Walker and Walker.

His work, which was as varied as his interests, as catholic as his tastes, covered a wide field ranging from domestic work of all sorts in and around Boston to Exposition Buildings at St. Louis and Omaha, from the Herald, Oliver Ditson, and Niles Buildings in Boston to the Second Church in Omaha—from such memorials as the War Memorial at Dedham or the John Boyle O'Reilly Monument in Boston to the entrance stairhall of the Boston Public Library, designed with McKim, Mead and White.

Walker's vigorous challenging mind, engaging personality and courageous support of his convictions won him increasing recognition among architects and laymen. His scholarship, for he was a profound student of the fine arts, his professional ability, his eloquence as a speaker won him appointments as lecturer at Harvard, the Massachusetts Institute of Technology, and the New England Conservatory of Music, gold medals from the American Institute of Architects, the Pennsylvania Academy, and the St. Louis and the Omaha Expositions, in addition to the degree of Doctor of Fine Arts from the University of Pennsylvania.

His death took from our midst a most vital, picturesque, and valiant spirit.

His was the privilege to love with so clear an insight that his criticism was only an incentive to greater effort. He differed violently

even with those dearest to him, and loved them the more that they withstood him. His tenacity was only equalled by his generosity.

For a younger generation he represented, not alone scholarly learning made vivid by personal reminiscence, but an essentially dynamic personality. Contact with him shook the student out of his immature complacency, revealed how narrow were his theories, and how without foundation his convictions.

The following lines from Browning's "Epilogue" were surely written to his measure.

"One who never turned his back but marched breast forward,
Never doubted clouds would break,
Never dreamed, though right were worsted, wrong would
triumph,
Held we fail to rise, are baffled to fight better, sleep to wake."

WILLIAM EMERSON.

WILLIAM MORTON WHEELER (1865-1937)

Fellow in Class II, Section III, 1909

William Morton Wheeler was born in Milwaukee, Wisconsin, 19 March 1865, and died suddenly in Cambridge, Massachusetts, on Patriots Day, 19 April 1937. Dr. Wheeler's early life was spent in his native city. Here he attended school, graduated from the German-American Normal College in 1884, and, after an absence of nearly a year at Ward's Natural Science Establishment in Rochester, New York, he served first as a teacher in the Milwaukee High School, 1885 to 1887, and then as Custodian of the newly established Milwaukee Public Museum, 1887 to 1890. In the autumn of 1890 he became Fellow and Assistant in Morphology under Dr. C. O. Whitman at Clark University, Worcester, Massachusetts. From Clark he removed with Dr. Whitman to the newly established University of Chicago where as Instructor in Embryology and subsequently as Assistant Professor of that subject he remained from 1892 to 1899. As a preparation for this work, Wheeler spent the academic year of 1893-1894 abroad and studied at Würzburg, the Zoological Station at Naples, and at Liège. After about six years at Chicago, he accepted the Professorship of Zoology at the University of Texas, Austin, Texas. Here he remained till 1903 when he became Curator of Invertebrate

Zoology at the American Museum of Natural History in New York City. After five years of administrative work in the Museum, he returned to teaching by accepting the position of Professor of Economic Entomology at the Bussey Institution of Harvard University. Later, in 1926, he assumed the more appropriate title of Professor of Entomology and in 1934 he was made Professor of Entomology Emeritus. From 1915 to 1929 he was Dean of the Faculty of the Bussey Institution and from 1929 to 1937 he was Associate Curator of Insects in the Museum of Comparative Zoölogy.

Wheeler's early training in languages, which included beside Greek and Latin, the more important modern European tongues, stood him always in stead and his reading was extensive in breadth and voluminous in amount. By those who knew him best he was reported to be the most widely read member of his university. His reading included belles-lettres as well as science, in short all literature. As a result of his early thorough training in languages and his wide acquaintance with the printed word, his own style was unusually lucid and pungent. Few of his writings, even those of a purely technical character, are without literary turns that the reader will always take delight in recalling, and his more popular addresses, such as "The Termitodoxa, or Biology and Society" (1920) and "The Dry-Rot of our Academic Biology" (1923), are replete with witty criticisms and comments that mark Wheeler a past master in his art. Of his three hundred and more publications the majority, as might be expected, are entomological in substance and most of these deal with that group of insects, the ants, which claimed his closest attention.

His eminence in biological science was recognized by election to membership in all the important biological societies in America and in many abroad. He was made a fellow of the American Academy of Arts and Sciences, March 10, 1909. He was a recipient of the Elliott Medal of the National Academy of Sciences in 1922 and of the Leidy Medal from the Philadelphia Academy of Natural Sciences in 1931. He served as Harvard Exchange Professor with France in 1925. He held honorary degrees from the University of Chicago, Harvard University, Columbia University, and the University of California. The French Republic made him an Officer in the Legion of Honor. He took great pleasure in the distinctions bestowed upon him, but these honors never disturbed his unassuming demeanor and his native modesty.

Wheeler is too near the present generation to allow any one to form an estimate of his genius, for genius he had in the fullest sense. As a man of scientific letters, he was supreme. He was possessed of extraordinary knowledge. His sincerity was beyond reproach. To paraphrase from a recent tribute to him, he was a great experience in the lives of those who knew him, and his departure leaves a void that nothing can fill.

Dr. Wheeler was survived by all his immediate family, his wife, Mrs. Dora Emerson Wheeler, his son, Dr. Ralph Emerson Wheeler, and his daughter, Miss Adeline Wheeler.

GEORGE HOWARD PARKER.

FRANCIS HENRY WILLIAMS (1852-1936)

Fellow in Class II, Section 4, 1902

Francis Henry Williams, son of Henry Willard and Elizabeth (Dewe) Williams, was born in Uxbridge, Mass., October 15, 1852. He early evinced a love of scientific study, and entered the Massachusetts Institute of Technology in 1869, graduating in 1873 with the degree of Bachelor of Science in Chemistry. His scientific interests were not confined to chemistry, however, for the following year he served as assistant on the United States Transit of Venus Expedition to Japan, and on the completion of this work continued his travels on a tour around the world. On returning home in 1875 he entered the Harvard Medical School and received his M.D. degree in 1877. This was followed by two years of additional medical study in Europe, notably in Vienna and Paris. In 1879 he began his long and exceptionally useful practice in Boston. In 1884 he was appointed Instructor in *Materia Medica* and in 1885 Assistant Professor of *Materia Medica* and general Therapeutics at the Harvard Medical School, an association which he maintained until 1891. For twenty years, from 1883 to 1913 he was connected with the Boston City Hospital, first as Physician to the Out Patient Department, and from 1896 to 1913 as Visiting Physician. In 1913 he was made Senior Physician, a post of honor which he held for many years.

Dr. Williams' service to medicine was of great significance. In 1892 he initiated the taking of cultures from the throat in suspected diphtheria cases, and their bacteriological examination, a procedure

which is now universal in well-ordered city health departments, and in 1894 he was the first in this community to use antitoxin in the treatment of the disease. Important as were these procedures, Dr. Williams will be especially remembered for those epoch-making investigations on X-rays begun in 1896 at the City Hospital and in the laboratory of physics at the Massachusetts Institute of Technology, for he insisted on exact knowledge of the science he applied as well as delicacy in the control of its application in diagnosis or therapeutic use. His theoretical work coupled with his extensive application in the diagnosis of thoracic conditions, and later in investigations of the alimentary tract, made him the leader in the use of this new tool in medicine. His extensive and exhaustive studies led to the publication of his book "The Roentgen Rays in Medicine and Surgery," the first edition of which appeared in 1901. This was the original monograph on clinical radiology produced in America, and so authoritative that two later editions were soon demanded. He was among the first to recognize the damage caused by repeated dosages of X-rays on living tissue, and adopted protective devices for his patients and himself. He also devised and built with the cooperation of his brother-in-law, Dr. William Rollins, several new types of equipment, including a 7-foot static machine for use in X-ray application.

After the discovery of radium in 1898, Dr. Williams turned his attention to its possibilities in the treatment of disease. With characteristic thoroughness he visited Paris and conferred with the Curies. By 1900 he had developed original methods for the treatment of certain diseases by the use of beta rays from radium, especially some types of diseased tonsils (thus making operation unnecessary) and many diseases of the eye. His work was always carried on with most scrupulous accuracy of measurement, and he always emphasized the necessity that the physician should know the dangers that might accrue from failure to observe with absolute accuracy the potency of the rays used. His first paper on the use of radium was published in 1904, on "Some Physical Properties and Medical Uses of Radium Salts," and contained a record of 42 cases treated with radium bromide. In all his publications, which were numerous, and in his verbal statements he cautioned against use of radium salts without due discrimination or absolute control of dosages. Again his inventive genius, in cooperation with Dr. Rollins, brought into existence numerous

devices for exact measurement of rays and particles, and equipment for use in the study and treatment of certain maladies which might be combatted by use of this new curative agent. Radiology owes much to him, for he was a scientific pioneer whose discoveries were given to the profession freely with no thought of personal advantage.

Dr. Williams married in 1891 Miss Anna Dunn Phillips of Boston, a lady of many charitable and philanthropic interests. Her death preceded that of Dr. Williams by about a year. There were no children.

Dr. Williams was widely known in scientific associations. He was not only a Fellow of this Academy, but of the American Association for the Advancement of Science, and a member of the American Medical Association, the Massachusetts Medical Society, and the Société de Radiologie Médicale de France, and the Association of American Physicians of which he was president in 1917-18. His honorary and corresponding memberships included the K. K. Gesellschaft der Aerzte of Vienna, American Radium Society, American Roentgen Society, and the Radiological Society of North America.

One other phase of Dr. Williams' life is worthy of record,—his long association with and great loyalty to the Massachusetts Institute of Technology. He was elected to life membership in its Corporation in 1882, and was a member of its Executive Committee for more than 25 years, and also served for a long period as Secretary of the Corporation. His services as a member of the Visiting Committee on its Departments of Biology and Chemistry were characterized by keen insight and inquiry into the needs and aims of the department, and he was most helpful and generous in his efforts to advance scientific work. For more than fifty years his devotion to his Alma Mater was of the highest type whether in days of great poverty and danger, or in later times when its expansion and continued efficiency were assured by friends and Alumni.

In his personal qualities Dr. Williams was also remarkable. His appearance always commanded attention, not only because of his height, carriage, and a fineness and intellectuality of countenance, but also because he was always an example of kindly dignity and true courtesy.

He had a deep appreciation of science and the arts, and a keen sense of humor, and while reticent and unaggressive, possessed a

warm spirit of friendliness and companionship. In a word, he was a fine exponent of scientific medicine, a true investigator, and above all, a cultured gentleman faithful always to his ideals of professional action and of human relations.

S. C. PRESCOTT.

JAMES HAUGHTON WOODS (1864-1935)

Fellow in Class IV, Section 1, 1914

James Haughton Woods was born in Boston, November 27, 1864, son of Joseph Wheeler Woods and Caroline Frances Fitz. His inheritance on either side might have indicated his bent toward teaching or the ministry; but the breadth of his interests and his erudition, especially in Oriental languages, literatures, and philosophies, gave him a unique place among American scholars. At the time of his death in Tokyo (January 13, 1935), he was engaged in the study of manuscripts of the Tendai sect of Japanese Buddhism which had been left to his editing by William Sturgis Bigelow, long resident in Japan. He was preparing for publication a translation of the *Visuddhi-Magga*, an important Cinghalese source for southern Buddhism. He had some knowledge of at least fifteen languages, most of them tools for his Oriental studies; and in this field he was particularly occupied with the difficult bit of history in which Buddhism, passing from India into Thibet and China, assumed the several Mahayana forms now found in China and Japan.

Preparation for his life work was broad and long-continued. During fifteen years after his graduation from Harvard in 1887, he was chiefly occupied with studies in Europe and America, in classical languages, the philosophies of Greece and India, theology, anthropology, Sanskrit and Indic Philology (under Lanman). He received the degree of Ph.D. in philosophy at Strassburg in 1896. It was in 1902 that his interests took their definitive turn. Advised by Lanman and William James, he spent some time in the spring of that year with Deussen, at Kiel, and then proceeded to India, where he spent a year in Kashmir and at Benares, the first of several visits to the Orient.

In the fall of 1903 he became instructor in philosophy at Harvard, dealing with the philosophical systems of India. He remained a member of the department of philosophy until his retirement in 1934.

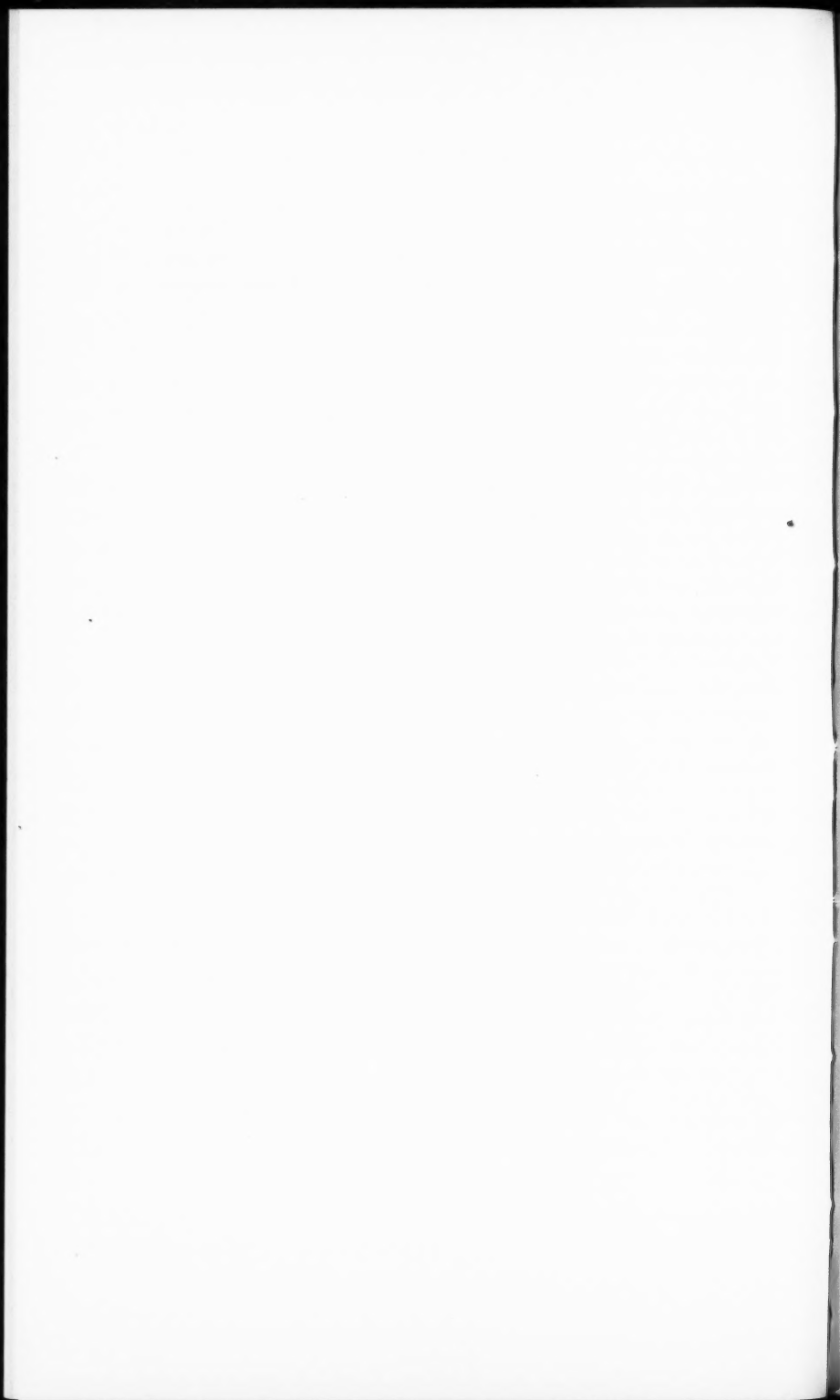
During this time he was thrice chairman of the department, and twice exchange professor at the Sorbonne.

His published work was almost entirely in the field of Indian philosophies, the Vedanta, the Yoga, and Buddhism,—translations, commentaries, editions of texts. Among his translations are to be mentioned *The Yoga System of Patanjali* (1914), *Mani-Prabha* (1915), and the *Visuddhi-magga*, awaiting publication. He collaborated with D. Kosambi (Bombay) in preparing for the Pali Text Society an edition of the first part of *Papancasudani*, an important commentary on the *Majjhima Nikaya*.

He was married in 1907 to Gertrude Baldwin, who died in 1926, and in 1927 to Elizabeth Robinson, who survives him.

Wood's life was one of distinguished effectiveness in fields of difficult endeavor, requiring infinite patience and persistence as well as discernment and sympathy. His power was carried with great quietness and modesty. He was not fluent in vocal expression; he was rather silent, except for his laugh which at once revealed the hearty simplicity of his spirit; always easily approachable but not widespread in social relationships, he was deep and loyal in his friendships, which included men in all parts of the world. He did much to maintain the strength of the department of philosophy at Harvard, and to build up the Harvard-Yenching Foundation of which he was a trustee from 1928 onward. He left a lasting mark on students and colleagues, not more by his learning and the wholly fresh interpretations he was able to give of the traditions of Asia, than by the personal affection which he gave and inspired, and which followed him with tributes both in this country and in the Orient.

W. E. HOCKING.



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FELLOWS AND FOREIGN HONORARY MEMBERS

(Corrected to March 15, 1938)

FELLOWS—767

(Number limited to eight hundred)

The year of election is indicated in the left margin, the century being omitted; thus 21 means 1921, 92 means 1892. When a Fellow resigned and was re-elected, the year of re-election is indicated in the ordinary way, the year of election is enclosed in square brackets. The year of election of an Associate, now a Fellow, is indicated by round brackets.

CLASS I—*Mathematical and Physical Sciences*—209

SECTION I—*Mathematics and Astronomy*—50

21	Charles Greeley Abbot	Washington, D. C.
32	Clarence Raymond Adams	Providence, R. I.
22	Walter Sydney Adams	Pasadena, Cal.
12	George Russell Agassiz	Boston
17	Raymond Clare Archibald	Providence, R. I.
32	Albert Arnold Bennett	Providence, R. I.
13	George David Birkhoff	Cambridge
35	Gilbert Ames Bliss	Chicago, Ill.
12	Ernest William Brown	New Haven, Conn.
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13	Julian Lowell Coolidge	Cambridge
15	Leonard Eugene Dickson	Chicago, Ill.
33	Jesse Douglas	Brooklyn, N. Y.
34	Griffith Conrad Evans	Berkeley, Cal.
15	Philip Fox	Evanston, Ill.

92	Fabian Franklin	New York, N. Y.
30	Philip Franklin	Belmont
24	William Caspar Graustein	Cambridge
32	Einar Hille	New Haven, Conn.
15	Frank Lauren Hitchcock	Belmont
13	Edward Vermilye Huntington	Cambridge
15	Dunham Jackson	Minneapolis, Minn.
15	Carl Otto Lampland	Flagstaff, Ariz.
25	Willem Jacob Luyten	Minneapolis, Minn.
34	Donald Howard Menzel	Cambridge
19	George Abram Miller	Urbana, Ill.
24	John Anthony Miller	Swarthmore, Pa.
23	Samuel Alfred Mitchell	University, Va.
29	Marston Morse	Princeton, N. J.
19	Forest Ray Moulton	Washington, D. C.
18	Henry Bayard Phillips	Belmont
96	Charles Lane Poor	New York, N. Y.
14	Roland George Dwight Richardson	Providence, R. I.
21	Henry Norris Russell	Princeton, N. J.
31	George Rutledge	Belmont
21	Frank Schlesinger	New Haven, Conn.
20	Harlow Shapley	Cambridge
09	Vesto Melvin Slipher	Flagstaff, Ariz.
17	Frederick Slocum	Middletown, Conn.
19	Virgil Snyder	Ithaca, N. Y.
21	Joel Stebbins	Madison, Wis.
27	Harlan True Stetson	Waban
33	Marshall Harvey Stone	Cambridge
30	Dirk Jan Struik	Belmont
28	Jacob David Tamarkin	Providence, R. I.
23	Oswald Veblen	Princeton, N. J.
29	Joseph Leonard Walsh	Cambridge
25	Alfred North Whitehead	Cambridge
32	David Vernon Widder	Cambridge
12	Frederick Shenstone Woods	Newton Center

CLASS I, SECTION II—*Physics*—61

28	Adelbert Ames, Jr.	Hanover, N. H.
11	Joseph Sweetman Ames	Baltimore, Md.
37	Kenneth Tompkins Bainbridge	Cambridge
21	Samuel Jackson Barnett	Los Angeles, Cal.
12	Percy William Bridgman	Cambridge
26	Walter Guyton Cady	Middletown, Conn.
03	George Ashley Campbell	New York, N. Y.
21	Leslie Lyle Campbell	Cambridge
16	Emory Leon Chaffee	Belmont
28	Arthur Holly Compton	Chicago, Ill.
31	Karl Taylor Compton	Cambridge
12	Daniel Frost Comstock	Cambridge
15	William David Coolidge	Schenectady, N. Y.
34	Franzo Hazlett Crawford	Williamstown
13	Henry Crew	Evanston, Ill.
11	Harvey Nathaniel Davis	Hoboken, N. J.
29	Clinton Joseph Davisson	New York, N. Y.
12	Arthur Louis Day	Bethesda, Md.
14	William Johnson Drisko	Addison, Me.
01	Alexander Wilmer Duff	Worcester
09	Arthur Woolsey Ewell	Worcester
97	Harry Manley Goodwin	Brookline
83	Edwin Herbert Hall	Cambridge
29	Arthur Cobb Hardy	Wellesley
31	George Russell Harrison	Belmont
95	Hammond Vinton Hayes	Boston
14	John Charles Hubbard	Baltimore, Md.
17	Gordon Ferrie Hull	Hanover, N. H.
14	Charles Clifford Hutchins	Brunswick, Me.
14	James Edmund Ives	Washington, D. C.
22	Edwin Crawford Kemble	Cambridge
13	Norton Adams Kent	Newton Center
37	Ernest Orlando Lawrence	Berkeley, Cal.
99	Henry Lefavour	Boston
31	Robert Bruce Lindsay	Providence, R. I.
01	Theodore Lyman	Brookline
34	Louis Williams McKeehan	New Haven, Conn.

14 Ernest George Merritt	Ithaca, N. Y.
14 Dayton Clarence Miller	Cleveland, O.
14 Robert Andrews Millikan	Pasadena, Cal.
34 Harry Rowe Mimno	Cambridge
34 Philip McCord Morse	Belmont
07 Charles Ladd Norton	Boston
31 Otto Oldenberg	Cambridge
34 Leigh Page	New Haven, Conn.
07 George Washington Pierce	Cambridge
35 Floyd Karker Richtmyer	Ithaca, N. Y.
16 Frederick Albert Saunders	Cambridge
27 John Clarke Slater	Cambridge
37 George William Stewart	Iowa City, Ia.
96 John Stone Stone	San Diego, Cal.
37 Jabez Curry Street	Cambridge
12 Maurice deKay Thompson	Brookline
28 Manuel Sandoval Vallarta	Brookline
35 Robert Jemison Van de Graaff	Cambridge
34 John Hasbrouck Van Vleck	Cambridge
35 Bertram Eugene Warren	Cambridge
18 David Locke Webster	Palo Alto, Cal.
11 Edwin Bidwell Wilson	Brookline
13 Robert Williams Wood	Baltimore, Md.
17 John Zeleny	New Haven, Conn.

CLASS I, SECTION III—*Chemistry*—52

26 Roger Adams	Urbana, Ill.
13 Wilder Dwight Bancroft	Ithaca, N. Y.
07 Gregory Paul Baxter	Cambridge
29 James Alexander Beattie	Belmont
19 Arthur Alphonzo Blanchard	Brookline
14 Marston Taylor Bogert	New York, N. Y.
36 Harold Simmons Booth	Cleveland, O.
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37 John Tileston Edsall	Cambridge

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36	Ernest Hamlin Huntress	Melrose Highlands
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15	Warren Kendall Lewis	Newton
23	Duncan Arthur MacInnes	New York, N. Y.
32	Kenneth Lamartine Mark	Boston
35	Nicholas Athanasius Milas	Belmont
36	Avery Adrian Morton	Watertown
19	Edward Mueller	Cambridge
91	Charles Edward Munroe	Forest Glen, Md.
07	James Flack Norris	Boston
13	William Albert Noyes	Urbana, Ill.
31	William Albert Noyes, Jr.	Providence, R. I.
14	Samuel Cate Prescott	Brookline
79	Robert Hallowell Richards	Jamaica Plain
14	Martin André Rosanoff	Pittsburgh, Pa.
28	George Scatchard	Cambridge
32	Walter Cecil Schumb	East Milton
15	Miles Standish Sherrill	Brookline
20	Harry Monmouth Smith	Brookline
34	Leighton Bruerton Smith	Beverly
22	Richard Chace Tolman	Pasadena, Cal.
11	Willis Rodney Whitney	Schenectady, N. Y.

- 19 Robert Seaton Williams Belmont
 34 David Elbridge Worrall Medford

CLASS I, SECTION IV—*Technology and Engineering*—46

- 06 Comfort Avery Adams Philadelphia, Pa.
 33 Harold Kilbrith Barrows Winchester
 31 Charles Harold Berry Belmont
 25 Vannevar Bush Belmont
 34 Otto Gustav Colbiornsen Dahl Brookline
 34 Chester Laurens Dawes Cambridge
 34 Jacob Pieter Den Hartog Wellesley Hills
 20 Theodore Harwood Dillon Brookline
 27 Philip Drinker Newton Center
 22 Gano Dunn New York, N. Y.
 21 William Frederick Durand Palo Alto, Cal.
 27 Gordon Maskew Fair Cambridge
 19 Frederic Harold Fay Boston
 32 Glennon Gilboy Lincoln
 32 Albert Haertlein Watertown
 36 Murray Philip Horwood Newton Center
 23 William Hovgaard Brooklyn, N. Y.
 34 Jerome Clarke Hunsaker Boston
 23 James Robertson Jack Watertown
 11 Dugald Caleb Jackson Cambridge
 30 Frank Baldwin Jewett New York, N. Y.
 01 Lewis Jerome Johnson Cambridge
 37 Joseph Henry Keenan Medford
 05 Arthur Edwin Kennelly Cambridge
 32 Ralph Restieaux Lawrence Belmont
 23 William Henry Lawrence Jamaica Plain
 21 Charles Thomas Main Winchester
 12 Lionel Simeon Marks Cambridge
 34 Edward Leyburn Moreland Wellesley
 33 Arthur Edwin Norton Cambridge
 20 Frederick Law Olmsted Brookline
 15 Charles Francis Park Taunton
 28 Langdon Pearce Chicago, Ill.
 13 Harold Pender Philadelphia, Pa.

30	Greenleaf Whittier Pickard	Newton Center
30	George Edmond Russell	Bedford
03	Albert Sauveur	Cambridge
01	Henry Lloyd Smyth	Windsor, Vt.
14	Charles Milton Spofford	Boston
28	John F. Stevens	Baltimore, Md.
23	Edward Pearson Warner	New York, N. Y.
29	Arthur Edward Wells	New York, N. Y.
37	Harald Malcolm Westergaard	Belmont
27	Robert Spurr Weston	Brookline
33	Frank Edward Winsor	West Newton
15	Joseph Ruggles Worcester	Waltham

CLASS II—*Natural and Physiological Sciences*—213

SECTION I—*Geology, Mineralogy, and Physics of the Globe*—51

15	Wallace Walter Atwood	Worcester
21	Norman Levi Bowen	Chicago, Ill.
16	Isaiah Bowman	Baltimore, Md.
33	Charles Franklin Brooks	Milton
29	Kirk Bryan	Cambridge
33	Frank Morton Carpenter	Newtonville
93	Henry Helm Clayton	Canton
09	Reginald Aldworth Daly	Cambridge
34	Sterling Price Fergusson	Milton
18	William Ebenezer Ford	New Haven, Conn.
17	James Walter Goldthwait	Hanover, N. H.
14	Louis Caryl Graton	Cambridge
17	Herbert Ernest Gregory	Honolulu, T. H.
21	William Jackson Humphreys	Washington, D. C.
16	Ellsworth Huntington	New Haven, Conn.
95	Robert Tracy Jackson	Boston
02	Thomas Augustus Jaggar	Honolulu, T. H.
08	Douglas Wilson Johnson	New York, N. Y.
21	Arthur Keith	Washington, D. C.
10	Alfred Church Lane	Cambridge
25	Esper Signius Larson, Jr.	Belmont
15	Andrew Cowper Lawson	Berkeley, Cal.
16	Charles Kenneth Leith	Madison, Wis.

12	Waldemar Lindgren	Brookline
17	Alexander George McAdie	Hampton, Va.
31	George Francis McEwen	La Jolla, Cal.
27	Donald Hamilton McLaughlin	Cambridge
25	Kirtley Fletcher Mather	Newton Center
26	Edward Bennett Mathews	Baltimore, Md.
35	Warren Judson Mead	Cambridge
21	John Campbell Merriam	Washington, D. C.
17	William John Miller	Los Angeles, Cal.
32	Frederick Kuhne Morris	Cambridge
34	Walter Harry Newhouse	Medford
03	Charles Palache	Cambridge
17	Percy Edward Raymond	Lexington
22	Austin Flint Rogers	Palo Alto, Cal.
34	Carl-Gustaf Arvid Rossby	Hingham
15	Robert Wilcox Sayles	Chestnut Hill
19	Waldemar Theodore Schaller	Washington, D. C.
15	Charles Schuchert	New Haven, Conn.
12	William Berryman Scott	Princeton, N. J.
11	Hervey Woodburn Shimer	Hingham
25	Frank Bursley Taylor	Fort Wayne, Ind.
17	Thomas Wayland Vaughan	Washington, D. C.
08	Charles Hyde Warren	New Haven, Conn.
14	Herbert Percy Whitlock	New York, N. Y.
35	Derwent Stainthorpe Whittlesey	Cambridge
15	Bailey Willis	Palo Alto, Cal.
95	John Eliot Wolff	Pasadena, Cal.
15	Frederick Eugene Wright	Washington, D. C.

CLASS II, SECTION II—*Botany*—35

30	LeRoy Abrams	Stanford University, Cal.
11	Oakes Ames	North Easton
34	Edgar Anderson	St. Louis, Mo.
23	Joseph Charles Arthur	Lafayette, Ind.
15	Irving Widmer Bailey	Cambridge
00	Liberty Hyde Bailey	Ithaca, N. Y.
21	Edward Wilber Berry	Baltimore, Md.
98	Douglas Houghton Campbell	Palo Alto, Cal.

16	Bradley Moore Davis	Ann Arbor, Mich.
35	Bernard Ogilvie Dodge	New York, N. Y.
11	Edward Murray East	Jamaica Plain
21	Rollins Adams Emerson	Ithaca, N. Y.
12	Alexander William Evans	New Haven, Conn.
29	Joseph Horace Faull	Cambridge
00	Merritt Lyndon Fernald	Cambridge
11	Robert Almer Harper	New York, N. Y.
98	John George Jack	East Walpole
28	Willis Linn Jepson	Berkeley, Cal.
27	Ivan Murray Johnston	Brookline
34	Donald Forsha Jones	New Haven, Conn.
21	Jacob Goodale Lipman	New Brunswick, N. J.
14	Burton Edward Livingston	Baltimore, Md.
21	Elmer Drew Merrill	Jamaica Plain
10	Winthrop John Vanleuven Osterhout	New York, N. Y.
27	George James Peirce	Palo Alto, Cal.
14	Alfred Rehder	Jamaica Plain
30	Karl Sax	Jamaica Plain
16	William Albert Setchell	Berkeley, Cal.
34	Edmund Ware Sinnott	New York, N. Y.
34	Gilbert Morgan Smith	Stanford University, Cal.
23	Elvin Charles Stakman	St. Paul, Minn.
92	William Trelease	Urbana, Ill.
31	Charles Alfred Weatherby	Cambridge
22	William Henry Weston, Jr.	Cambridge
32	Ralph Hartley Wetmore	Belmont

CLASS II, SECTION III—*Zoology and Physiology*—71

22	Nathan Banks	Jamaica Plain
16	Thomas Barbour	Boston
33	Philip Bard	Baltimore, Md.
09	Francis Gano Benedict	Boston
11	Henry Bryant Bigelow	Concord
14	Robert Payne Bigelow	Brookline
35	Charles Henry Blake	Lincoln
20	William T. Bovie	Bar Harbor, Me.
24	Edward Allen Boyden	Minneapolis, Minn.

16	John Lewis Bremer	Boston
15	Charles Thomas Brues	Jamaica Plain
28	John Wymond Miller Bunker	Belmont
06	Walter Bradford Cannon	Cambridge
22	Thorne Martin Carpenter	Boston
00	William Ernest Castle	Berkeley, Cal.
14	Charles Value Chapin	Providence, R. I.
29	Lemuel Roscoe Cleveland	Jamaica Plain
26	Edwin Joseph Cohn	Cambridge
14	Edwin Grant Conklin	Princeton, N. J.
23	Manton Copeland	Brunswick, Me.
27	William John Crozier	Cambridge
17	Joseph Augustine Cushman	Sharon
35	J[ohn] Frank[lín] Daniel	Berkeley, Cal.
95	Charles Benedict Davenport	Cold Spring Harbor, N. Y.
29	Hallowell Davis	Belmont
33	Alden Benjamin Dawson	Belmont
25	Samuel Randall Detwiler	New York, N. Y.
25	Herbert McLean Evans	Berkeley, Cal.
30	Henry Clinton Fall	Tyngsboro
34	Cyrus Hartwell Fiske	Belmont
15	Alexander Forbes	Milton
34	John Farquhar Fulton	New Haven, Conn.
31	William King Gregory	New York, N. Y.
29	Joseph Grinnell	Berkeley, Cal.
89	Samuel Henshaw	Cambridge
36	Frederick Lee Hisaw	Cambridge
29	Leigh Hoadley	Cambridge
34	Hudson Hoagland	Worcester
24	Samuel Jackson Holmes	Berkeley, Cal.
28	Roy Graham Hoskins	Waban
13	Leland Ossian Howard	Washington, D. C.
14	Herbert Spencer Jennings	Baltimore, Md.
13	Charles Atwood Kofoid	Berkeley, Cal.
16	Frederic Thomas Lewis	Waban
33	Frank Rattray Lillie	Chicago, Ill.
14	Ralph Stayner Lillie	Chicago, Ill.
17	Richard Swann Lull	New Haven, Conn.

84	Edward Laurens Mark	Cambridge
15	Albert Davis Mead	Providence, R. I.
27	Axel Leonard Melander	New York, N. Y.
35	Karl Friedrich Meyer	San Francisco, Cal.
21	Gerrit Smith Miller	Washington, D. C.
28	Thomas Hunt Morgan	Pasadena, Cal.
14	Herbert Vincent Neal	Tufts College
95	George Howard Parker	Cambridge
19	Raymond Pearl	Baltimore, Md.
15	John Charles Phillips	Wenham
21	Henry Augustus Pilsbry	Philadelphia, Pa.
27	Frederick Haven Pratt	Wellesley Hills
09	Herbert Wilbur Rand	Belmont
32	David Rapport	Cambridge
23	Alfred Clarence Redfield	Milton
34	Alfred Newton Richards	Philadelphia, Pa.
34	Oscar Riddle	Cold Spring Harbor, N. Y.
13	William Emerson Ritter	Berkeley, Cal.
37	Alfred Sherwood Romer	Cambridge
25	Alexander Grant Ruthven	Ann Arbor, Mich.
15	Arthur Wisswald Weyssse	Boston
02	Edmund Beecher Wilson	New York, N. Y.
15	Frederick Adams Woods	Rome, Italy
33	Jeffries Wyman, Jr.	Chestnut Hill

CLASS II, SECTION IV—*Medicine and Surgery*—56

32	Joseph Charles Aub	Belmont
36	Oswald Theodore Avery	New York, N. Y.
29	James Bourne Ayer	Milton
(28) 32	Franklin Greene Balch	Boston
31	George Blumer	New Haven, Conn.
36	Charles Sidney Burwell	Brookline
21	Charles Macfie Campbell	Cambridge
19	Alexis Carrel	New York, N. Y.
31	William Bosworth Castle	Brookline
30	David Cheever	Boston
13	Henry Asbury Christian	Brookline
21	Rufus Cole	Mount Kisco, N. Y.

14	Harvey Cushing	New Haven, Conn.
32	Elliott Carr Cutler	Brookline
31	Eugene Floyd DuBois	New York, N. Y.
33	Reginald Fitz	Brookline
11	Simon Flexner	New York, N. Y.
27	James Lawder Gamble	Brookline
22	Joseph Lincoln Goodale	Boston
21	Ross Granville Harrison	New Haven, Conn.
27	Percy Rogers Howe	Belmont
21	William Henry Howell	Baltimore, Md.
33	Edgar Erskine Hume	Carlisle, Pa.
15	Reid Hunt	Boston
34	Henry Jackson, Jr.	Chestnut Hill
12	Elliott Proctor Joslin	Boston
23	Roger Irving Lee	Brookline
29	Edwin Allen Locke	Williamstown
28	Warfield Theobald Longcope	Baltimore, Md.
32	Fred Bates Lund	Newton
33	George Burgess Magrath	Boston
13	Frank Burr Mallory	Brookline
21	William James Mayo	Rochester, Minn.
34	Leroy Matthew Simpson Miner	Newtonville
26	George Richards Minot	Brookline
28	William Lorenzo Moss	Augusta, Ga.
28	John Howard Mueller	West Roxbury
25	Robert Bayley Osgood	Boston
37	Walter Walker Palmer	New York, N. Y.
27	Joseph Hershey Pratt	Boston
35	Tracy Jackson Putnam	Brookline
34	William Carter Quinby	Brookline
34	Arthur Hiler Ruggles	Providence, R. I.
27	Andrew Watson Sellards	Boston
33	George Cheever Shattuck	Brookline
30	Torald Hermann Sollmann	Cleveland, Ohio
21	Charles Wardell Stiles	Washington, D. C.
14	Richard Pearson Strong	Boston
30	Fritz Bradley Talbot	Brookline
14	Ernest Edward Tyzzer	Wakefield

14	Frederick Herman Verhoeff	Brookline
27	Joseph Treloar Wearn	Cleveland, Ohio
33	Soma Weiss	Cambridge
25	Benjamin White	New York, N. Y.
12	Simeon Burt Wolbach	South Sudbury
23	Hans Zinsser	Boston

CLASS III—*The Social Arts*—152SECTION I—*Jurisprudence*—38

(24) 32	Francis Noyes Balch	Jamaica Plain
06	Joseph Henry Beale	Cambridge
36	Stoughton Bell	Cambridge
33	Harry Augustus Bigelow	Chicago, Ill.
33	Henry Wolf Bickl��	Philadelphia, Pa.
36	Wilfred Bolster	Brookline
36	Claude Raymond Branch	Providence, R. I.
33	Benjamin Nathan Cardozo	Washington, D. C.
33	John Dickinson	Washington, D. C.
31	Fred Tarbell Field	Newton
32	Felix Frankfurter	Cambridge
30	Thomas Hovey Gage	Worcester
33	Theodore Francis Green	Providence, R. I.
32	Walter Perley Hall	Fitchburg
33	Learned Hand	New York, N. Y.
18	Charles Evans Hughes	Washington, D. C.
31	Nathan Isaacs	Cambridge
21	Frederick Lawton	Boston
32	Sayre Macneil	Azusa, Cal.
32	Calvert Magruder	Cambridge
31	William DeWitt Mitchell	New York, N. Y.
31	Edmund Morris Morgan	Arlington
31	Herbert Parker	South Lancaster
36	Philip Stanley Parker	Brookline
36	Henry Parkman, Jr.	Boston
01	George Wharton Pepper	Philadelphia, Pa.
11	Roscoe Pound	Watertown
36	Stanley Elroy Qua	Lowell
12	Arthur Prentice Rugg	Worcester

32 Francis Bowes Sayre	Washington, D. C.
21 Austin Wakeman Scott	Cambridge
35 James Brown Scott	Washington, D. C.
36 Sidney Post Simpson	Cambridge
33 Harlan Fiske Stone	Washington, D. C.
32 Edward Sampson Thurston	Cambridge
14 Eugene Wambaugh	Cambridge
37 Joseph Warren	Brookline
(28) 32 Edmund Allen Whitman	Cambridge

CLASS III, SECTION II—*Government, International Law, and Diplomacy*—26

36 Howard Landis Bevis	Cambridge
33 Edwin Montefiore Borchard	New Haven, Conn.
32 William Richards Castle, Jr.	Washington, D. C.
32 Joseph Perkins Chamberlain	New York, N. Y.
33 Robert Treat Crane	New York, N. Y.
35 Tyler Dennett	
31 Sidney Bradshaw Fay	Cambridge
27 William Cameron Forbes	Norwood
34 Edgar Stephenson Furniss	New Haven, Conn.
32 Joseph Clark Grew	Tokyo, Japan
35 Charles Grove Haines	Los Angeles, Cal.
16 Albert Bushnell Hart	Cambridge
27 Arthur Norman Holcombe	Cambridge
31 Manley Ottmer Hudson	Cambridge
32 Philip Carryl Jessup	New York, N. Y.
36 Morris Bryan Lambie	Cambridge
97 Abbott Lawrence Lowell	Boston
18 William MacDonald	New York, N. Y.
32 Charles Edward Merriam	Chicago, Ill.
19 John Bassett Moore	New York, N. Y.
13 William Bennett Munro	Pasadena, Cal.
27 Westel Woodbury Willoughby	Washington, D. C.
32 William Franklin Willoughby	Washington, D. C.
14 George Grafton Wilson	Cambridge
27 Quincy Wright	Chicago, Ill.
33 Henry Aaron Yeomans	Cambridge

CLASS III, SECTION III—*Economics and Sociology*—62

36	James Waterhouse Angell	New York, N. Y.
36	James Cummings Bonbright	New York, N. Y.
33	Harold Hitchings Burbank	Cambridge
36	Philip Cabot	Milton
36	Edward Hastings Chamberlin	Cambridge
16	John Bates Clark	New York, N. Y.
34	John Maurice Clark	Westport, Conn.
28	Arthur Harrison Cole	Cambridge
31	Melvin Thomas Copeland	Cambridge
31	William Leonard Crum	Cambridge
32	William James Cunningham	Cambridge
34	Winthrop More Daniels	Saybrook Point, Conn.
21	Clive Day	New Haven, Conn.
13	Davis Rich Dewey	Cambridge
32	Arthur Stone Dewing	Newton
32	Wallace Brett Donham	Boston
34	John Franklin Ebersole	Belmont
36	Fred Rogers Fairchild	New Haven, Conn.
36	Frank Albert Fetter	Princeton, N. J.
12	Irving Fisher	New Haven, Conn.
31	James Ford	Cambridge
34	Ralph Evans Freeman	Cambridge
13	Edwin Francis Gay	Pasadena, Cal.
33	Sheldon Glueck	Cambridge
34	Robert Murray Haig	New York, N. Y.
32	Henry Wyman Holmes	Cambridge
34	Edwin Walter Kemmerer	Princeton, N. J.
34	Frank Hyneman Knight	Chicago, Ill.
36	Roswell Cheney McCrea	New York, N. Y.
34	Robert Morison MacIver	New York, N. Y.
32	Walter Wallace McLaren	Williamstown
36	Malcolm Perrine McNair	Cambridge
32	Leon Carroll Marshall	Chevy Chase, Md.
33	Edward Sagendorph Mason	Cambridge
36	Elton Mayo	Cambridge
34	Richard Stockton Meriam	South Lincoln
34	Harry Alvin Millis	Chicago, Ill.

32	Frederick Cecil Mills	New York, N. Y.
31	Wesley Clair Mitchell	New York, N. Y.
34	Arthur Eli Monroe	Cambridge
32	Harold Glenn Moulton	Washington, D. C.
34	Edwin Griswold Nourse	Washington, D. C.
32	William Fielding Ogburn	Chicago, Ill.
33	Robert Ezra Park	Chicago, Ill.
32	Leo S. Rowe	Washington, D. C.
37	Clyde Orval Ruggles	Cambridge
36	Thomas Henry Sanders	Cambridge
33	Josef Alois Schumpeter	Cambridge
32	Carl Snyder	New York, N. Y.
31	Pitirim Alexandrovich Sorokin	Winchester
31	Oliver Mitchell Wentworth Sprague	Cambridge
[89] 01	Frank William Taussig	Cambridge
34	Frederick John Teggart	Berkeley, Cal.
33	William Isaac Thomas	New York, N. Y.
37	Harry Rudolph Tosdal	Belmont
31	Donald Skeelee Tucker	Belmont
33	Abbott Payson Usher	Cambridge
34	Jacob Viner	Chicago, Ill.
32	John Henry Williams	Cambridge
36	Joseph Henry Willits	Swarthmore, Pa.
34	Leo Wolman	New York, N. Y.
34	Carle Clark Zimmerman	Winchester

CLASS III, SECTION IV—*Administration and Affairs*—26

(25) 32	Charles Francis Adams	Concord
(25) 32	Charles Foster Batchelder	Cambridge
32	Henry Sturgis Dennison	Framingham
(28) 32	William Lusk Webster Field	Milton
16	Frank Johnson Goodnow	Baltimore, Md.
35	Jerome Davis Greene	Cambridge
(28) 32	Edward Jackson Holmes	Boston
34	Matt Bushnell Jones	Newton Center
34	Henry Plimpton Kendall	Walpole
(27) 32	Nathaniel Thayer Kidder	Milton
32	Thomas William Lamont	New York, N. Y.

34	Clarence Cook Little	Bar Harbor, Me.
36	Dumas Malone	Cambridge
33	James Vance May	Boston
(24) 32	Andrew James Peters	Jamaica Plain
02	Herbert Putnam	Washington, D. C.
(28) 32	Alfred Lawrence Ripley	Andover
34	Erwin Haskell Schell	Cambridge
35	Henry Lee Shattuck	Boston
37	Henry Southworth Shaw	Exeter, N. H.
(28) 32	Payson Smith	Brookline
33	Albert Warren Stearns	Billerica
(25) 32	Charles Henry Taylor	Boston
36	Clair Elsmere Turner	Arlington
(24) 32	Edwin Sibley Webster	Brookline
(25) 32	Benjamin Loring Young	Weston

CLASS IV—*The Humanities*—193SECTION I—*Theology, Philosophy, and Psychology*—49

32	Michael Joseph Ahern	Weston
33	Gordon Willard Allport	Cambridge
32	James Rowland Angell	New Haven, Conn.
33	John Gilbert Beebe-Center	Swampscott
24	Edwin Garrigues Boring	Cambridge
28	Edgar Sheffield Brightman	Newton
31	Henry Addington Bruce	Cambridge
32	Leonard Carmichael	Rochester, N. Y.
36	Robert Pierce Casey	Providence, R. I.
33	J[ames] McKeen Cattell	Garrison, N. Y.
28	Walter Fenno Dearborn	Cambridge
18	Edmund Burke Delabarre	Providence, R. I.
24	Raymond Dodge	Tryon, N. C.
33	Curt John Ducasse	Providence, R. I.
37	Clarence Henry Graham	Providence, R. I.
30	William Henry Paine Hatch	Cambridge
32	William Healy	Boston
10	William Arthur Heidel	Middletown, Conn.
21	William Ernest Hocking	Cambridge
35	Clark Leonard Hull	New Haven, Conn.

33	Walter Samuel Hunter	Providence, R. I.
17	Frederick John Foakes Jackson	Englewood, N. J.
28	Albert Cornelius Knudson	Cambridge
34	Kurt Koffka	Northampton
32	Karl Spencer Lashley	Belmont
13	William Lawrence	Boston
29	Clarence Irving Lewis	Lexington
33	Lee Sullivan McCollester	Tufts College
22	William McDougall	Durham, N. C.
10	Edward Caldwell Moore	Cambridge
35	Henry Alexander Murray, Jr.	Boston
32	Arthur Darby Nock	Cambridge
32	William Cardinal O'Connell	Boston
28	Johnson O'Connor	Boston
17	Charles Edwards Park	Boston
18	Leighton Parks	London, England
33	Carroll Cornelius Pratt	New Brunswick, N. J.
30	James Hugh Ryan	Omaha, Neb.
31	Henry Knox Sherrill	Boston
27	Willard Learoyd Sperry	Cambridge
29	Russell Henry Stafford	Brookline
34	Lewis Madison Terman	Stanford University, Cal.
34	Edward Lee Thorndike	New York, N. Y.
37	Louis Leon Thurstone	Chicago, Ill.
28	Henry Bradford Washburn	Cambridge
17	John Broadus Watson	New York, N. Y.
33	Frederic Lyman Wells	Newton Highlands
35	Robert Sessions Woodworth	New York, N. Y.
15	Robert Mearns Yerkes	New Haven, Conn.

CLASS IV, SECTION II—*History, Archaeology, and Anthropology*—38

18	Charles McClean Andrews	New Haven, Conn.
28	James Phinney Baxter, 3d	Williamstown
23	Carl Lotus Becker	Ithaca, N. Y.
27	Robert Pierpont Blake	Cambridge
12	Franz Boas	New York, N. Y.
(25) 32	William Brooks Cabot	Boston
34	Clarence Gordon Campbell	New York, N. Y.

12	George Henry Chase	Cambridge
21	Max Farrand	San Marino, Cal.
21	William Scott Ferguson	Cambridge
10	Worthington Chauncey Ford	Cambridge
33	Henry Thatcher Fowler	Providence, R. I.
18	Evarts Boutell Greene	New York, N. Y.
19	Charles Downer Hazen	New York, N. Y.
14	Bert Hodge Hill	Athens, Greece
27	Earnest Albert Hooton	Cambridge
33	Halford Lancaster Hoskins	Tufts College
15	Aleš Hrdlička	Washington, D. C.
12	Alfred Louis Kroeber	Berkeley, Cal.
15	Kirsopp Lake	Haverford, Pa.
22	George LaPiana	Cambridge
32	Waldo Gifford Leland	Washington, D. C.
20	Charles Howard McIlwain	Belmont
14	Roger Bigelow Merriman	Cambridge
15	Samuel Eliot Morison	Boston
34	Robert Henry Pfeiffer	Cambridge
14	George Andrew Reisner	Boston
34	David Moore Robinson	Baltimore, Md.
23	Michael Ivanovich Rostovtzeff	New Haven, Conn.
33	Edward Sapir	New Haven, Conn.
27	George Sarton	Cambridge
36	Donald Scott	Cambridge
34	Theodore Leslie Shear	Princeton, N. J.
26	Herbert Joseph Spinden	Brooklyn, N. Y.
32	Charles Holt Taylor	Cambridge
11	Charles Cutler Torrey	New Haven, Conn.
11	Alfred Marston Tozzer	Cambridge
20	Clark Wissler	New York, N. Y.

CLASS IV, SECTION III—*Philology*—56

31	Edward Cooke Armstrong	Princeton, N. J.
33	William Nickerson Bates	Philadelphia, Pa.
35	Charles Henry Beeson	Chicago, Ill.
33	Campbell Bonner	Ann Arbor, Mich.
35	Robert Johnson Bonner	Chicago, Ill.

33	Carleton Brown	New York, N. Y.
21	Carl Darling Buck	Chicago, Ill.
18	Edward Capps	Princeton, N. J.
20	Walter Eugene Clark	Cambridge
32	Ronald Salmon Crane	Chicago, Ill.
32	Morris William Croll	Princeton, N. J.
31	Samuel Hazzard Cross	Cambridge
20	Franklin Edgerton	New Haven, Conn.
21	Frank Edgar Farley	Middletown, Conn.
14	Jeremiah Denis Mathias Ford	Cambridge
35	Tenney Frank	Baltimore, Md.
30	James Geddes, Jr.	Brookline
13	Charles Hall Grandgent	Cambridge
16	Louis Herbert Gray	New York, N. Y.
25	William Chase Greene	Cambridge
13	Charles Burton Gulick	Cambridge
19	Roy Kenneth Hack	Cincinnati, Ohio
34	Austin Morris Harmon	New Haven, Conn.
31	Raymond Dexter Havens	Baltimore, Md.
18	George Lincoln Hendrickson	New Haven, Conn.
17	William Guild Howard	Cambridge
21	Eugene Xavier Louis Henry Hyvernati	Washington, D. C.
15	Carl Newell Jackson	Cambridge
13	James Richard Jewett	Cambridge
32	(Ralph) Hayward Keniston	Chicago, Ill.
34	Roland Grubb Kent	Philadelphia, Pa.
98	George Lyman Kittredge	Cambridge
33	Hans Kurath	Providence, R. I.
32	Ernest Felix Langley	Cambridge
[81] 98	Charles Rockwell Lanman	Cambridge
33	Ivan Mortimer Linforth	Berkeley, Cal.
11	Albert Matthews	Boston
35	Benjamin Dean Meritt	Princeton, N. J.
28	William Albert Nitze	Chicago, Ill.
32	George Rapall Noyes	Berkeley, Cal.
34	William Abbott Oldfather	Urbana, Ill.
33	Howard Rollin Patch	Northampton
32	Arthur Stanley Pease	Cambridge

35	Henry Washington Prescott	Chicago, Ill.
13	Edward Kennard Rand	Cambridge
11	Fred Norris Robinson	Cambridge
31	Robert Kilburn Root	Princeton, N. J.
35	Henry Arthur Sanders	Ann Arbor, Mich.
18	Rudolph Schevill	Berkeley, Cal.
32	Horatio Elwin Smith	New York, N. Y.
89	Franklin Bache Stephenson	Washington, D. C.
32	William Thomson	Cambridge
33	George Benson Weston	Cambridge
30	Ernest Hatch Wilkins	Oberlin, Ohio
33	Harry Austryn Wolfson	Cambridge
33	Karl Young	New Haven, Conn.

CLASS IV, SECTION IV—*The Fine Arts and Belles Lettres*—50

31	Stephen Vincent Benét	New York, N. Y.
26	Frank Weston Benson	Salem
32	(William) Welles Bosworth	New York, N. Y.
33	John Alden Carpenter	Chicago, Ill.
32	Chalmers Dancy Clifton	New York, N. Y.
33	Charles Collens	Newton Center
32	Kenneth John Conant	Cambridge
34	Charles Jay Connick	Newtonville
29	Charles Townsend Copeland	Cambridge
[17] 30	Ralph Adams Cram	Boston
33	Cyrus Edwin Dallin	Arlington Heights
34	Samuel Foster Damon	Providence, R. I.
32	George Harold Edgell	Cambridge
21	William Emerson	Cambridge
33	Carl Engel	New York, N. Y.
30	John Erskine	New York, N. Y.
10	Arthur Fairbanks	Hanover, N. H.
18	Edward Waldo Forbes	Cambridge
31	Robert Frost	South Shaftsbury, Vt.
27	Wallace Goodrich	Boston
14	Robert Grant	Boston
36	William Clifford Heilman	Cambridge
29	Edward Burlingame Hill	Boston

31	Robert Silliman Hillyer	Cambridge
27	Charles Hopkinson	Manchester
12	Mark Antony DeWolfe Howe	Boston
18	Archer Milton Huntington	New York, N. Y.
31	Henry James	New York, N. Y.
(25) 32	William James	Cambridge
33	Leo Rich Lewis	Tufts College
20	John Ellerton Lodge	Washington, D. C.
21	John Livingston Lowes	Cambridge
21	Charles Donagh Maginnis	Brookline
31	Paul Manship	New York, N. Y.
31	Daniel Gregory Mason	New York, N. Y.
31	Frank Jewett Mather	Washington Crossing, Pa.
31	Kenneth Ballard Murdock	Cambridge
14	William Allan Neilson	Northampton
28	Curtis Hidden Page	Gilmanton, N. H.
21	William Lyon Phelps	New Haven, Conn.
(24) 32	Anthony John Philpott	Arlington
21	Chandler Rathfon Post	Cambridge
22	Paul Joseph Sachs	Cambridge
14	Ellery Sedgwick	Boston
19	Henry Dwight Sedgwick	Dedham
33	David Stanley Smith	Woodbridge, Conn.
35	Walter Raymond Spalding	Cambridge
27	Edmund C. Tarbell	New Castle, N. H.
14	Owen Wister	Philadelphia, Pa.
22	Charles Henry Conrad Wright	Cambridge

FOREIGN HONORARY MEMBERS—112

(Number limited to one hundred and thirty)

CLASS I—*Mathematical and Physical Sciences*—31SECTION I—*Mathematics and Astronomy*—9

22	Sir Arthur Stanley Eddington	Cambridge, England
34	Ronald Aylmer Fisher	Harpenden, Herts
20	Jacques Salomon Hadamard	Paris
21	Godfrey Harold Hardy	Cambridge, England
27	Ejnar Hertzprung	Leyden
17	Tullio Levi-Civita	Rome
03	Charles Émile Picard	Paris
15	Charles Jean de la Vallée Poussin	Louvain
29	Hermann Weyl	Princeton, N. J.

CLASS I, SECTION II—*Physics*—8

29	Vilhelm Frimann Koren Bjerknes	Oslo
24	Albert Einstein	Princeton, N. J.
29	James Franck	Baltimore, Md.
29	Abram F. Joffé	Leningrad
03	Sir Joseph Larmor	Cambridge, England
28	Friedrich Paschen	Charlottenburg
14	Max Planck	Berlin
02	Sir Joseph John Thomson	Cambridge, England

CLASS I, SECTION III—*Chemistry*—7

29	Johannes N. Brönsted	Copenhagen
27	Peter Debye	Berlin
33	Jaroslav Heyrovsky	Prague
33	Fritz Paneth	London
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29	Heinrich Wieland	Munich
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34	Luigi Lombardi	Rome

25	Maurice d'Ocagne	Paris
29	Ludwig Prandtl	Göttingen
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29	Aurel Stodola	Zürich
31	Karl Willy Wagner	Berlin

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36	Raoul Blanchard	Grenoble, France
14	Waldemar Christofer Brögger	Oslo
29	Léon William Collet	Geneva
34	Arthur Holmes	Durham
22	Emmanuel de Margerie	Paris
21	Gustaf Adolf Frederik Molengraaff	Delft
18	Sir William Napier Shaw	London

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32	Frederick Orpen Bower	Ripon
31	Ludwig Diels	Berlin
32	Kingo Miyabe	Sapporo, Japan
29	Otto Renner	Jena
32	Sir Albert Charles Seward	London
35	Sir William Wright Smith	Edinburgh

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34	Archibald Vivian Hill	London
31	August Krogh	Copenhagen
30	Louis Édouard Lapicque	Paris
28	Charles Tate Regan	London
33	Hans Spemann	Freiburg i. Br.
28	Sir D'Arcy Wentworth Thompson	St. Andrews

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27	Sir Henry Hallett Dale	London

33	Sir Arthur Keith	London
28	Mikinosuke Miyajima	Tokyo
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18	Sir Charles Scott Sherrington	Ipswich, England
36	(Jean) Hyacinthe Vincent	Paris

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33	Hans Kelsen	Vienna
33	Juljusz Makarewicz	Lwów
33	Rudolph Stammler	Wernigerode a. H.
33	Giorgio Del Vecchio	Rome

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32	Paul Claudel	Paris
32	Hu Shih	Peiping

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35	Luigi Einaudi	Turin
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35	John Maynard Keynes	Cambridge, England
35	René Maunier	Paris
28	Arthur Cecil Pigou	Cambridge, England
32	Charles Rist	Fraisses (Loire)
33	Werner Sombart	Berlin
35	S. Rudolph Steinmetz	Amsterdam
34	Peter B. Struve	Belgrade

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23	Henry Guy	Grenoble
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27	Henri Rabaud	Paris

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 Lowes, J. L. F, IV: 4
 Lull, R. S. F, II: 3
 Lund, F. B. F, II: 4
 Luyten, W. J. F, I: 1
 Lyman, T. F, I: 2
 McAdie, A. G. F, II: 1
 McColester, L. S. F, IV: 1
 McCrea, R. C. F, III: 3
 MacDonald, W. F, III: 2
 McDougall, W. F, IV: 1
 McEwen, G. F. F, II: 1
 Mellwain, C. H. F, IV: 2
 MacInnes, D. A. F, I: 3
 MacIver, R. M. F, III: 3
 McKeehan, L. W. F, I: 2
 McLaren, W. W. F, III: 3
 McLaughlin, D. H. F, II: 1
 McNair, M. P. F, III: 3
 Macneil, S. F, III: 1
 Maginnis, C. D. F, IV: 4
 Magrath, G. B. F, II: 4
 Magruder, C. F, III: 1
 Main, C. T. F, I: 4
 Makarewicz, J. FHM, III: 1
 Mallory, F. B. F, II: 4
 Malone, D. F, III: 4
 Manship, P. F, IV: 4
 Margerie, E. de. FHM, II: 1
 Mark, E. L. F, II: 3
 Mark, K. L. F, I: 3
 Marks, L. S. F, I: 4
 Marshall, L. C. F, III: 3
 Mason, D. G. F, IV: 4
 Mason, E. S. F, III: 3
 Mather, F. J. F, IV: 4
 Mather, K. F. F, II: 1
 Mathews, E. B. F, II: 1
 Matthews, A. F, IV: 3
 Maunier, R. FHM, III: 3
 May, J. V. F, III: 4
 Mayo, E. F, III: 3
 Mayo, W. J. F, II: 4
 Mazon, P. FHM, IV: 3
 Mead, A. D. F, II: 3
 Mead, W. J. F, II: 1
 Meinecke, F. FHM, IV: 2
 Melander, A. L. F, II: 3
 Menzel, D. H. F, I: 1

- Meriam, R. S. F, III: 3
 Meritt, B. D. F, IV: 3
 Merriam, C. E. F, III: 2
 Merriam, J. C. F, II: 1
 Merrill, E. D. F, II: 2
 Merriman, R. B. F, IV: 2
 Merritt, E. G. F, I: 2
 Meyer, K. F. F, II: 3
 Milas, N. A. F, I: 3
 Miller, D. C. F, I: 2
 Miller, G. A. F, I: 1
 Miller, G. S. F, II: 3
 Miller, J. A. F, I: 1
 Miller, W. J. F, II: 1
 Millikan, R. A. F, I: 2
 Millis, H. A. F, III: 3
 Mills, F. C. F, III: 3
 Mimno, H. R. F, I: 2
 Miner, L. M. S. F, II: 4
 Minot, G. R. F, II: 4
 Mitchell, S. A. F, I: 1
 Mitchell, W. C. F, III: 3
 Mitchell, W. DeW. F, III: 1
 Miyabe, K. FHM, II: 2
 Miyajima, M. FHM, II: 4
 Molengraaff, G. A. F. FHM, II: 1
 Monroe, A. E. F, III: 3
 Moore, E. C. F, IV: 1
 Moore, J. B. F, III: 2
 Moreland, E. L. F, I: 4
 Morgan, E. M. F, III: 1
 Morgan, T. H. F, II: 3
 Morison, S. E. F, IV: 2
 Morris, F. K. F, II: 1
 Morse, M. F, I: 1
 Morse, P. M. F, I: 2
 Morton, A. A. F, I: 3
 Moss, W. L. F, II: 4
 Moulton, F. R. F, I: 1
 Moulton, H. G. F, III: 3
 Mueller, E. F, I: 3
 Müller, F. von. FHM, II: 4
 Mueller, J. H. F, II: 4
 Munro, W. B. F, III: 2
 Munroe, C. E. F, I: 3
 Murdock, K. B. F, IV: 4
 Murray, G. FHM, IV: 4
 Murray, H. A., Jr. F, IV: 1
 Neal, H. V. F, II: 3
 Neilson, W. A. F, IV: 4
 Newhouse, W. H. F, II: 1
 Nitze, W. A. F, IV: 3
 Nock, A. D. F, IV: 1
 Norris, J. F. F, I: 3
 Norton, A. E. F, I: 4
 Norton, C. L. F, I: 2
 Nourse, E. G. F, III: 3
 Noyes, G. R. F, IV: 3
 Noyes, W. A. F, I: 3
 Noyes, W. A., Jr. F, I: 3
 d'Ocagne, M. FHM, I: 4
 O'Connell, W. H. F, IV: 1
 O'Connor, J. F, IV: 1
 Oertel, H. FHM, IV: 3
 Ogburn, W. F. F, III: 3
 Oldenberg, O. F, I: 2
 Oldfather, W. A. F, IV: 3
 Olmsted, F. L. F, I: 4
 Osgood, R. B. F, II: 4
 Osterhout, W. J. V. F, II: 2
 Page, C. H. F, IV: 4
 Page, L. F, I: 2
 Palache, C. F, II: 1
 Palmer, W. W. F, II: 4
 Paneth, F. FHM, I: 3
 Park, C. E. F, IV: 1
 Park, C. F. F, I: 4
 Park, R. E. F, III: 3
 Parker, G. H. F, II: 3
 Parker, H. F, III: 1
 Parker, P. S. F, III: 1
 Parkman, H., Jr. F, III: 1
 Parks, L. F, IV: 1
 Paschen, F. FHM, I: 2
 Patch, H. R. F, IV: 3
 Pearl, R. F, II: 3
 Pearse, L. F, I: 4
 Pease, A. S. F, IV: 3
 Peers, E. A. FHM, IV: 4
 Peirce, G. J. F, II: 2
 Pender, H. F, I: 4
 Pepper, G. W. F, III: 1

- Peters, A. J. F, III: 4
 Pfeiffer, R. H. F, IV: 2
 Phelps, W. L. F, IV: 4
 Phillips, H. B. F, I: 1
 Phillips, J. C. F, II: 3
 Philpott, A. J. F, IV: 4
 Picard, C. E. FHM, I: 1
 Pickard, G. W. F, I: 4
 Pidal, R. M. FHM, IV: 3
 Pierce, G. W. F, I: 2
 Piéron, H. FHM, IV: 1
 Pigou, A. C. FHM, III: 3
 Pillsbury, H. A. F, II: 3
 Pirenne, H. FHM, IV: 2
 Planck, M. FHM, I: 2
 Poor, C. L. F, I: 1
 Post, C. R. F, IV: 4
 Pound, R. F, III: 1
 Prandtl, L. FHM, I: 4
 Pratt, C. C. F, IV: 1
 Pratt, F. H. F, II: 3
 Pratt, J. H. F, II: 4
 Prescott, H. W. F, IV: 3
 Prescott, S. C. F, I: 3
 Probst, E. FHM, I: 4
 Putnam, H. F, III: 4
 Putnam, T. J. F, II: 4
 Qua, S. E. F, III: 1
 Quinby, W. C. F, II: 4
 Rabaud, H. FHM, IV: 4
 Rand, E. K. F, IV: 3
 Rand, H. W. F, II: 3
 Rapport, D. F, II: 3
 Raymond, P. E. F, II: 1
 Redfield, A. C. F, II: 3
 Regan, C. T. FHM, II: 3
 Rehder, A. F, II: 2
 Reisner, G. A. F, IV: 2
 Renner, O. FHM, II: 2
 Richards, A. N. F, II: 3
 Richards, R. H. F, I: 3
 Richardson, R. G. D. F, I: 1
 Richtmyer, F. K. F, I: 2
 Riddle, O. F, II: 3
 Ripley, A. L. F, III: 4
 Rist, C. FHM, III: 3
 Ritter, W. E. F, II: 3
 Robinson, D. M. F, IV: 2
 Robinson, F. N. F, IV: 3
 Rogers, A. F. F, II: 1
 Romer, A. S. F, II: 3
 Root, R. K. F, IV: 3
 Rosanoff, M. A. F, I: 3
 Rossby, C. G. A. F, II: 1
 Rostovtzeff, M. I. F, IV: 2
 Rowe, L. S. F, III: 3
 Rugg, A. P. F, III: 1
 Ruggles, A. H. F, II: 4
 Ruggles, O. C. F, III: 3
 Russell, G. E. F, I: 4
 Russell, H. N. F, I: 1
 Ruthven, A. G. F, II: 3
 Rutledge, G. F, I: 1
 Ryan, J. H. F, IV: 1
 Sachs, P. J. F, IV: 4
 Sanders, H. A. F, IV: 3
 Sanders, T. H. F, III: 3
 Sapir, E. F, IV: 2
 Sarton, G. F, IV: 2
 Saunders, F. A. F, I: 2
 Sauveur, A. F, I: 4
 Sax, K. F, II: 2
 Sayles, R. W. F, II: 1
 Sayre, F. B. F, III: 1
 Scatchard, G. F, I: 3
 Schaller, W. T. F, II: 1
 Schell, E. H. F, III: 4
 Schevill, R. F, IV: 3
 Schlesinger, F. F, I: 1
 Schuchert, C. F, II: 1
 Schumb, W. C. F, I: 3
 Schumpeter, J. A. F, III: 3
 Scott, A. W. F, III: 1
 Scott, D. F, IV: 2
 Scott, J. B. F, III: 1
 Scott, W. B. F, II: 1
 Sedgwick, E. F, IV: 4
 Sedgwick, H. D. F, IV: 4
 Sellards, A. W. F, II: 4
 Setchell, W. A. F, II: 2
 Seward, Sir A. C. FHM, II: 2
 Shapley, H. F, I: 1

- Shattuck, G. C. F, II: 4
 Shattuck, H. L. F, III: 4
 Shaw, H. S. F, III: 4
 Shaw, Sir W. N. FHM, II: 1
 Shear, T. L. F, IV: 2
 Sherrill, H. K. F, IV: 1
 Sherrill, M. S. F, I: 3
 Sherrington, Sir C. S. FHM, II: 4
 Shimer, H. W. F, II: 1
 Simpson, S. P. F. III: 1
 Sinnott, E. W. F, II: 2
 Slater, J. C. F, I: 2
 Slipher, V. M. F, I: 1
 Slocum, F. F, I: 1
 Smith, D. S. F, IV: 4
 Smith, G. M. F, II: 2
 Smith, H. E. F, IV: 3
 Smith, H. M. F, I: 3
 Smith, L. B. F, I: 3
 Smith, P. F, III: 4
 Smith, Sir W. W. FHM, II: 2
 Smyth, H. L. F, I: 4
 Snyder, C. F, III: 3
 Snyder, V. F, I: 1
 Sörensen, S. P. L. FHM, I: 3
 Sollmann, T. H. F, II: 4
 Sombart, W. FHM, III: 3
 Sorokin, P. A. F, III: 3
 Spalding, W. R. F, IV: 4
 Spemann, H. FHM, II: 3
 Sperry, W. L. F, IV: 1
 Spinden, H. J. F, IV: 2
 Spofford, C. M. F, I: 4
 Sprague, O. M. W. F, III: 3
 Stafford, R. H. F, IV: 1
 Stakman, E. C. F, II: 2
 Stammler, R. FHM, II: 1
 Stamp, Sir J. FHM, III: 4
 Sterns, A. W. F, III: 4
 Stebbins, J. F, I: 1
 Stein, Sir A. FHM, IV: 2
 Steinmetz, S. R. FHM, III: 3
 Stephenson, F. B. F, IV: 3
 Stetson, H. T. F, I: 1
 Stevens, J. F. F, I: 4
 Stewart, G. W. F, I: 2
 Stiles, C. W. F, II: 4
 Stodola, A. FHM, I: 4
 Stone, H. F. F, III: 1
 Stone, J. S. F, I: 2
 Stone, M. H. F, I: 1
 Street, J. C. F, I: 2
 Strong, R. P. F, II: 4
 Struik, D. J. F, I: 1
 Struve, P. B. FHM, III: 3
 Talbot, F. B. F, II: 4
 Tamarkin, J. D. F, I: 1
 Tarbell, E. C. F, IV: 4
 Taussig, F. W. F, III: 3
 Taylor, C. H. F, III: 4
 Taylor, C. H. F, IV: 2
 Taylor, F. B. F, II: 1
 Teggart, F. J. F, III: 3
 Terman, L. M. F, IV: 1
 Thomas, F. W. FHM, IV: 3
 Thomas, W. I. F, III: 3
 Thompson, Sir D'A. W. FHM, II: 3
 Thompson, M. deK. F, I: 2
 Thomson, Sir J. J. FHM, I: 2
 Thomson, W. F, IV: 3
 Thorndike, E. L. F, IV: 1
 Thurston, E. S. F, III: 1
 Thurstone, L. L. F, IV: 1
 Tolman, R. C. F, I: 3
 Torrey, C. C. F, IV: 2
 Tosdal, H. R. F, III: 3
 Tozzer, A. M. F, IV: 2
 Trelease, W. F, II: 2
 Trevelyan, G. M. FHM, IV: 2
 Tucker, D. S. F, III: 3
 Turner, C. E. F, III: 4
 Tyzzer, E. E. F, II: 4
 Usher, A. P. F, III: 3
 Vallarta, M. S. F, I: 2
 Vallée Poussin, C. J. de la. FHM, I: 1
 Van de Graaff, R. J. F, I: 2
 Van Vleck, J. H. F, I: 2
 Vaughan, T. W. F, II: 1
 Veblen, O. F, I: 1
 Vecchio, G. Del. FHM, III: 1
 Verhoeff, F. H. F, II: 4
 Vincent, J. H. FHM, II: 4

- Viner, J. F, III: 3
 Wagner, K. W. FHM, I: 4
 Walsh, J. L. F, I: 1
 Wambaugh, E. F, III: 1
 Warner, E. P. F, I: 4
 Warren, B. E. F, I: 2
 Warren, C. H. F, II: 1
 Warren, J. F, III: 1
 Washburn, H. B. F, IV: 1
 Watson, J. B. F, IV: 1
 Wearn, J. T. F, II: 4
 Weatherby, C. A. F, II: 2
 Webster, D. L. F, I: 2
 Webster, E. S. F, III: 4
 Weiss, S. F, II: 4
 Wells, A. E. F, I: 4
 Wells, F. L. F, IV: 1
 Westergaard, H. M. F, I: 4
 Weston, G. B. F, IV: 3
 Weston, R. S. F, I: 4
 Weston, W. H., Jr. F, II: 2
 Wetmore, R. H. F, II: 2
 Weyl, H. FHM, I: 1
 Weyssse, A. W. F, II: 3
 White, B. F, II: 4
 Whitehead, A. N. F, I: 1
 Whitlock, H. P. F, II: 1
 Whitman, E. A. F, III: 1
 Whitney, W. R. F, I: 3
 Whittlesey, D. S. F, II: 1
 Widder, D. V. F, I: 1
 Wieland, H. FHM, I: 3
 Wilkins, E. H. F, IV: 3
 Williams, J. H. F, III: 3
 Williams, R. S. F, I: 3
 Willis, B. F, II: 1
 Willits, J. H. F, III: 3
 Willoughby, W. F. F, III: 2
 Willoughby, W. W. F, III: 2
 Willstätter, R. FHM, I: 3
 Wilson, E. B. F, II: 3
 Wilson, E. B. F, I: 2
 Wilson, G. G. F, III: 2
 Winsor, F. E. F, I: 4
 Wissler, C. F, IV: 2
 Wister, O. F, IV: 4
 Wolbach, S. B. F, II: 4
 Wolff, J. E. F, II: 1
 Wolfson, H. A. F, IV: 3
 Wolman, L. F, III: 3
 Wood, R. W. F, I: 2
 Woods, F. A. F, II: 3
 Woods, F. S. F, I: 1
 Woodworth, R. S. F, IV: 1
 Worcester, J. R. F, I: 4
 Worrall, D. E. F, I: 3
 Wright, C. H. C. F, IV: 4
 Wright, F. E. F, II: 1
 Wright, Q. F, III: 2
 Wyman, J., Jr. F, II: 3
 Yeomans, H. A. F, III: 2
 Yerkes, R. M. F, IV: 1
 Young, B. L. F, III: 4
 Young, K. F, IV: 3
 Zeleny, J. F, I: 2
 Zimmerman, C. C. F, III: 3
 Zinsser, H. F, II: 4

STATUTES AND STANDING VOTES.

STATUTES.

Adopted November 8, 1911: amended May 8, 1912, January 8, and May 14, 1913, April 14, 1915, April 12, 1916, April 10, 1918, May 14, 1919, February 8, April 12, and December 13, 1922, February 14, March 14, and October 10, 1923, March 10, 1926, May 9, 1928, April 8 and November 11, 1931, April 12, 1933, and February 14, 1934.

CHAPTER I.

THE CORPORATE SEAL.

ARTICLE 1. The Corporate Seal of the Academy shall be as here depicted:



ARTICLE 2. The Recording Secretary shall have the custody of the Corporate Seal.

See Chap. v, art. 3; chap. vi, art. 2.

CHAPTER II.

FELLOWS AND FOREIGN HONORARY MEMBERS AND DUES.

ARTICLE 1. The Academy consists of Fellows, who are either citizens or residents of the United States of America, and Foreign Honorary Members. They are arranged in four Classes, according to the Arts and Sciences in which they are severally proficient, and each Class is divided into four Sections, namely:

CLASS I. *The Mathematical and Physical Sciences*

- Section 1. Mathematics and Astronomy
- Section 2. Physics
- Section 3. Chemistry
- Section 4. Technology and Engineering

CLASS II. *The Natural and Physiological Sciences*

- Section 1. Geology, Mineralogy, and Physics of the Globe
- Section 2. Botany
- Section 3. Zoölogy and Physiology
- Section 4. Medicine and Surgery

CLASS III. *The Social Arts*

- Section 1. Jurisprudence
- Section 2. Government, International Law, and Diplomacy
- Section 3. Economics and Sociology
- Section 4. Administration and Affairs.

CLASS IV. *The Humanities*

- Section 1. Theology, Philosophy, and Psychology
- Section 2. History, Archæology, and Anthropology
- Section 3. Philology
- Section 4. The Fine Arts and Belles Lettres

ARTICLE 2. The number of Fellows shall not exceed Eight hundred, of whom not more than Six hundred shall be residents of Massachusetts, nor shall there be more than Two hundred and twenty in any one Class.

ARTICLE 3. The number of Foreign Honorary Members shall not exceed One hundred and thirty. They shall be chosen from among citizens of foreign countries most eminent for their discoveries and

attainments in any of the Classes above enumerated. There shall not be more than Thirty-five in any one Class.

ARTICLE 4. If any person, after being notified of his election as Fellow, shall neglect for six months to accept in writing, or, if a Fellow resident within fifty miles of Boston shall neglect to pay his Admission Fee, his election shall be void; and if any Fellow resident within fifty miles of Boston shall neglect to pay his Annual Dues for six months after they are due, provided his attention shall have been called to this Article of the Statutes in the meantime, he shall cease to be a Fellow; but the Council may suspend the provisions of this Article for a reasonable time.

With the previous consent of the Council, the Treasurer may dispense (*sub silentio*) with the payment of the Admission Fee or of the Annual Dues or both whenever he shall deem it advisable. In the case of officers of the Army or Navy who are out of the Commonwealth on duty, payment of the Annual Dues may be waived during such absence if continued during the whole financial year and if notification of such expected absence be sent to the Treasurer. Upon similar notification to the Treasurer, similar exemption may be accorded to Fellows subject to Annual Dues, who may temporarily remove their residence for at least two years to a place more than fifty miles from Boston.

If any person elected a Foreign Honorary Member shall neglect for six months after being notified of his election to accept in writing, his election shall be void.

See Chap. vii, art. 2.

ARTICLE 5. Every Fellow resident within fifty miles of Boston hereafter elected shall pay an Admission Fee of Ten dollars, unless previously as an Associate he has paid an Admission Fee of like amount.

Every Fellow resident within fifty miles of Boston shall, and others may, pay such Annual Dues, not exceeding Fifteen dollars, as shall be voted by the Academy at each Annual Meeting, when they shall become due; but any Fellow shall be exempt from the annual payment if, at any time after his admission, he shall pay into the treasury Two hundred dollars in addition to his previous payments. Any Fellow shall also be exempt from Annual Dues who has paid such dues

for forty years, or, having attained the age of seventy-five has paid dues for twenty-five years.

All Commutations of the Annual Dues shall be and remain permanently funded, the interest only to be used for current expenses.

Any Fellow not previously subject to Annual Dues who takes up his residence within fifty miles of Boston, shall pay to the Treasurer within three months thereafter Annual Dues for the current year, failing which his Fellowship shall cease; but the Council may suspend the provisions of this Article for a reasonable time.

Only Fellows who pay Annual Dues or have commuted them may hold office in the Academy or serve on the Standing Committees or vote at meetings.

ARTICLE 6. Fellows who pay or have commuted the Annual Dues and Foreign Honorary Members shall be entitled to receive gratis one copy of all Publications of the Academy issued after their election.

See Chap. xi, art. 2.

ARTICLE 7. Diplomas signed by the President and the Vice-President of the Class to which the member belongs, and countersigned by the Secretaries, shall be given to Foreign Honorary Members and to Fellows on request.

ARTICLE 8. If, in the opinion of a majority of the entire Council, any Fellow or Foreign Honorary Member shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his membership; and if three-fourths of the Fellows present, out of a total attendance of not less than fifty at a Stated Meeting, or at a Special Meeting called for the purpose, shall adopt this recommendation, his name shall be stricken from the Roll.

See Chap. iii; chap. vi, art. 1; chap. x, art. 1, 7; chap. xi, art. 2.

CHAPTER III.

ELECTION OF FELLOWS AND FOREIGN HONORARY MEMBERS.

The procedure in the election of Fellows and Foreign Honorary Members shall be as follows:

Nominations to Fellowship or Foreign Honorary Membership in any Section must be signed by Two Fellows of that Section, or by three Fellows of any Sections, and sent to the Corresponding Secretary ac-

accompanied by a statement of the qualifications of the nominee and brief biographical data.

Notice shall be sent to every Fellow not later than the fifteenth of January in each year, reminding him that all nominations must be in the hands of the Corresponding Secretary before the fifteenth of February following.

A list of the nominees, giving a brief account of each, with the names of the nominators, shall be sent to every Fellow with a request that he return the list with such confidential comments and indications of preference as he may choose to make.

All the nominations, with any comments thereon and with expressions of preference on the part of the Fellows, shall be referred to the appropriate Class Committees, which shall canvass them, and report their recommendations in writing to the Council before the Stated Meeting of the Academy in April.

Elections of Fellows and Foreign Honorary Members shall be made by the Council before the Annual Meeting in May, and announced at that meeting.

Persons nominated in any year, but not elected, may be carried over to the list of nominees for the next year at the discretion of the Council, but shall not be further continued unless renominated.

See Chap. ii; chap. vi, art. 1; chap. x, art. 1.

CHAPTER IV.

OFFICERS.

ARTICLE 1. The Officers of the Academy shall be a President (who shall be Chairman of the Council), four Vice-Presidents (one from each Class), a Corresponding Secretary (who shall be Secretary of the Council), a Recording Secretary, a Treasurer, a Librarian, and an Editor, all of whom shall be elected by ballot at the Annual Meeting, and shall hold their respective offices for one year, and until others are duly chosen and installed.

There shall be also sixteen Councillors, one from each Section of each Class. At each Annual Meeting four Councillors, one from each Class, shall be elected by ballot to serve for the full term of four years and until others are duly chosen and installed. The same Fellow shall not be eligible for two successive terms.

The Councillors, with the other officers previously named, and the Chairman of the House Committee, *ex officio*, shall constitute the Council.

See Chap. xi, art. 1.

ARTICLE 2. If any officer be unable, through death, absence, or disability, to fulfill the duties of his office, or if he shall resign, his place may be filled by the Council in its discretion for any part or the whole of the unexpired term.

ARTICLE 3. At the Stated Meeting in March, the President shall appoint a Nominating Committee of four Fellows having the right to vote, one from each Class. This Committee shall prepare a list of nominees for the several offices to be filled, and for the Standing Committees, and file it with the Recording Secretary not later than four weeks before the Annual Meeting.

See Chap. vi, art. 2.

ARTICLE 4. Independent nominations for any office, if signed by at least twenty Fellows having the right to vote, and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call therefor, and shall be mailed to all the Fellows having the right to vote.

See Chap. vi, art. 2.

ARTICLE 5. The Recording Secretary shall prepare for use in voting at the Annual Meeting a ballot containing the names of all persons duly nominated for office.

CHAPTER V.

THE PRESIDENT.

ARTICLE 1. The President, or in his absence the senior Vice-President present (seniority to be determined by length of continuous Fellowship in the Academy), shall preside at all meetings of the Academy. In the absence of all these officers, a Chairman of the meeting shall be chosen by ballot.

ARTICLE 2. Unless otherwise ordered, all Committees which are not elected by ballot shall be appointed by the presiding officer.

ARTICLE 3. Any deed or writing to which the Corporate Seal is to be affixed, except leases of real estate, shall be executed in the name of the Academy by the President or, in the event of his death, absence, or inability, by one of the Vice-Presidents, when thereto duly authorized.

See Chap. ii, art. 7; chap. iv, art. 1, 3; chap. vi, art. 2; chap. vii, art. 1; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1.

CHAPTER VI.

THE SECRETARIES.

ARTICLE 1. The Corresponding Secretary shall conduct the correspondence of the Academy and of the Council, recording or making an entry of all letters written in its name, and preserving for the files all official papers which may be received. At each meeting of the Council he shall present the communications addressed to the Academy which have been received since the previous meeting, and at the next meeting of the Academy he shall present such as the Council may determine.

He shall notify all persons who may be elected Fellows or Foreign Honorary Members, send to each a copy of the Statutes, and on their acceptance issue the proper Diploma. He shall also notify all meetings of the Council; and in case of the death, absence, or inability of the Recording Secretary he shall notify all meetings of the Academy.

Under the direction of the Council, he shall keep a List of the Fellows and Foreign Honorary Members, arranged in their several Classes and Sections. It shall be printed annually and issued as of the first day of July.

See Chap. ii, art. 7; chap. iii; chap. iv, art. 1; chap. x, art. 6; chap. xi, art. 1; chap. xii, art. 1.

ARTICLE 2. The Recording Secretary shall have the custody of the Charter, Corporate Seal, Archives, Statute-Book, Journals, and all literary papers belonging to the Academy.

Fellows borrowing such papers or documents shall receipt for them to their custodian.

The Recording Secretary shall attend the meetings of the Academy and keep a faithful record of the proceedings with the names of the Fellows present; and after each meeting is duly opened, he shall read the record of the preceding meeting.

He shall notify the meetings of the Academy to each Fellow and by

mail at least seven days beforehand, and in his discretion may also cause the meetings to be advertised; he shall apprise Officers and Committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy.

After all elections, he shall insert in the Records the names of the Fellows by whom the successful nominees were proposed.

He shall send the Report of the Nominating Committee in print to every Fellow having the right to vote at least three weeks before the Annual Meeting.

See Chap. iv, art. 3.

In the absence of the President and of the Vice-Presidents he shall, if present, call the meeting to order, and preside until a Chairman is chosen.

See Chap. i; chap. ii, art. 7; chap. iv, art. 3, 4, 5; chap. x, art. 6; chap. xi, art. 1, 2; chap. xii, art. 1, 3.

ARTICLE 3. The Secretaries, with the Editor, shall have authority to publish such of the records of the meetings of the Academy as may seem to them likely to promote its interests.

CHAPTER VII.

THE TREASURER AND THE TREASURY.

ARTICLE 1. The Treasurer shall collect all money due or payable to the Academy, and all gifts and bequests made to it. He shall pay all bills due by the Academy, when approved by the proper officers, except those of the Treasurer's office, which may be paid without such approval; in the name of the Academy he shall sign all leases of real estate; and, with the written consent of a member of the Committee on Finance, he shall make all transfers of stocks, bonds, and other securities belonging to the Academy, all of which shall be in his official custody.

He shall keep a faithful account of all receipts and expenditures, submit his accounts annually to the Auditing Committee, and render them at the expiration of his term of office, or whenever required to do so by the Academy or the Council.

He shall keep separate accounts of the income of the Rumford Fund, and of all other special Funds, and of the Appropriation thereof, and render them annually.

His accounts shall always be open to the inspection of the Council.

ARTICLE 2. He shall report annually to the Council at its March meeting on the expected income of the various Funds and from all other sources during the ensuing financial year. He shall also report the names of all Fellows who may be then delinquent in the payment of their Annual Dues.

ARTICLE 3. He shall give such security for the trust reposed in him as the Academy may require.

ARTICLE 4. With the approval of a majority of the Committee on Finance, he may appoint an Assistant Treasurer to perform his duties, for whose acts, as such assistant, he shall be responsible; or, with like approval and responsibility, he may employ any Trust Company doing business in Boston as his agent for the same purpose, the compensation of such Assistant Treasurer or agent to be fixed by the Committee on Finance and paid from the Funds of the Academy.

ARTICLE 5. At the Annual Meeting he shall report in print all his official doings for the preceding year, stating the amount and condition of all the property of the Academy entrusted to him, and the character of the investments.

ARTICLE 6. The Financial Year of the Academy shall begin with the first day of April.

ARTICLE 7. No person or committee shall incur any debt or liability in the name of the Academy, unless in accordance with a previous vote and appropriation therefor by the Academy or the Council, or sell or otherwise dispose of any property of the Academy, except cash or invested funds, without previous consent and approval of the Council.

See Chap. ii, art. 4, 5; chap. vi, art. 2; chap. x, art. 6; chap. xi, art. 1, 2, 3; chap. xii, art. 1.

CHAPTER VIII.

THE LIBRARIAN AND THE LIBRARY.

ARTICLE 1. The Librarian shall have charge of the printed books, keep a correct catalogue thereof, and provide for their delivery from the Library.

At the Annual Meeting, as Chairman of the Committee on the Library, he shall make a Report on its condition.

ARTICLE 2. In conjunction with the Committee on the Library he shall have authority to expend such sums as may be appropriated by the Academy for the purchase of books, periodicals, etc., and for defraying other necessary expenses connected with the Library.

ARTICLE 3. All books procured from the income of the Rumford Fund or of other special Funds shall contain a book-plate expressing the fact.

ARTICLE 4. Books taken from the Library shall be receipted for to the Librarian or his assistant.

ARTICLE 5. Books shall be returned in good order, regard being had to necessary wear with good usage. If any book shall be lost or injured, the Fellow to whom it stands charged shall replace it by a new volume or by a new set, if it belongs to a set, or pay the current price thereof to the Librarian, whereupon the remainder of the set, if any, shall be delivered to the Fellow so paying, unless such remainder be valuable by reason of association.

ARTICLE 6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

ARTICLE 7. The Librarian shall have the custody of the Publications of the Academy. With the advice and consent of the President, he may effect exchanges with other associations.

See Chap. ii, art. 6; chap. xi, art. 1, 2.

CHAPTER IX.

THE EDITOR AND THE PUBLICATIONS.

ARTICLE 1. The Editor shall have charge of the conduct through the press of the Proceedings and the Memoirs, and all correspondence relative thereto, and shall have power to fix the price at which individual numbers of the Proceedings and Memoirs are sold.

ARTICLE 2. In conjunction with the Committee of Publication, he shall have authority to expend such sums as may be appropriated by the Academy for printing the publications and for defraying other expenses therewith connected.

ARTICLE 3. All publications which are financed in whole or in part from the income of the Rumford Fund or from the income of other

special funds, and all publications of work done with the aid of the Rumford Fund or other special funds, shall contain a conspicuous statement of this fact.

ARTICLE 4. Two hundred extra copies of each paper printed in the Proceedings or Memoirs shall be placed at the disposal of the author without charge.

If, on account of the number of communications offered for publication, it shall be necessary to decline for publication communications otherwise acceptable, members of the Academy shall be given preference in each of the several Classes over non-members; but whenever it shall be necessary to exercise this preference, the Editor shall inform the Council of the fact.

See Chap. iv, art. 1; chap. vi, art. 3; chap. x, art. 6; chap. xi, art. 2, sect. 4.

CHAPTER X.

THE COUNCIL.

ARTICLE 1. The Council shall exercise a discreet supervision over all nominations and elections to membership, and in general supervise all the affairs of the Academy not explicitly reserved to the Academy as a whole or entrusted by it or by the Statutes to standing or special committees.

It shall consider all nominations duly sent to it by any Class Committee, and act upon them in accordance with the provisions of Chapter III.

With the consent of the Fellow interested, it shall have power to make transfers between the several Sections, reporting its action to the Academy.

See Chap. iii, art. 2, 3; chap. xi, art. 1.

ARTICLE 2. Nine members shall constitute a quorum.

ARTICLE 3. It shall establish rules and regulations for the transaction of its business, and provide all printed and engraved blanks and books of record.

ARTICLE 4. It shall act upon all resignations of officers, and all resignations and forfeitures of Fellowship; and cause the Statutes to be faithfully executed.

It shall appoint all agents and subordinates not otherwise provided for by the Statutes, prescribe their duties, and fix their compensation. They shall hold their respective positions during the pleasure of the Council.

ARTICLE 5. It may appoint, for terms not exceeding one year, and prescribe the functions of, such committees of its number, or of the Fellows of the Academy, as it may deem expedient, to facilitate the administration of the affairs of the Academy or to promote its interests.

ARTICLE 6. At its March meeting it shall receive reports from the President, the Secretaries, the Treasurer, and the Standing Committees, on the appropriations severally needed for the ensuing financial year. At the same meeting the Treasurer shall report on the expected income of the various Funds and from all other sources during the same year.

A report from the Council shall be submitted to the Academy, for action, at the March meeting, recommending the appropriation which in the opinion of the Council should be made.

On the recommendation of the Council, special appropriations may be made at any Stated Meeting of the Academy, or at a Special Meeting called for the purpose.

See Chap. xi, art. 3.

ARTICLE 7. After the death of a Fellow or Foreign Honorary Member, it shall appoint a member of the Academy to provide a biographical notice for publication in the Proceedings.

ARTICLE 8. It shall report at every meeting of the Academy such business as it may deem advisable to present.

See Chap. ii, art. 4, 5, 8; chap. iv, art. 1, 2; chap. vi, art. 1; chap. vii, art. 1; chap. xii, art. 1, 4.

CHAPTER XI.

STANDING COMMITTEES.

ARTICLE 1. The Class Committee of each Class shall consist of the Vice-President, who shall be chairman, and the four Councillors of the Class, together with such other officer or officers annually elected as may belong to the Class. It shall consider nominations to Fellowship

in its own Class, and report in writing to the Council such as may receive at a Class Committee Meeting a majority of the votes cast, provided at least three shall have been in the affirmative.

See Chap. iii, art. 2.

ARTICLE 2. At the Annual Meeting the following Standing Committees shall be elected by ballot to serve for the ensuing year:

(i) *The Committee on Finance*, to consist of four Fellows, who, through the Treasurer, shall have full control and management of the funds and trusts of the Academy, with the power of investing the funds and changing the investments thereof in their discretion.

See Chap. iv, art. 3; chap. vii, art. 1, 4; chap. x, art. 6.

(ii) *The Rumford Committee*, to consist of seven Fellows, who shall report to the Academy on all applications and claims for the Rumford Premium. It alone shall authorize the purchase of books, publications and apparatus at the charge of the income from the Rumford Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iii) *The Cyrus Moors Warren Committee*, to consist of seven Fellows, who shall consider all applications for appropriations from the income of the Cyrus Moors Warren Fund, and generally shall see to the proper execution of the trust.

See Chap. iv, art. 3; chap. x, art. 6.

(iv) *The Committee of Publication*, to consist of the Editor, *ex officio*, as Chairman, and four other Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Proceedings and the Memoirs shall be entrusted.

It shall fix the price at which volumes of the publications shall be sold; but Fellows may be supplied at half price with volumes which they are not entitled to receive gratis.

It shall determine when the pressure of material offered for publication makes it necessary to give preference to members of the Academy as compared with non-members, or to give priority to certain members as compared with others, and to what extent this preference or priority shall be applied in each of the four Classes, to the

end that a proper balance of the facilities of publication with respect to subject matter and authors may be maintained.

See Chap. iv, art. 3; chap. vi, art. 1, 3; chap. ix; chap. x, art. 6.

(v) *The Committee on the Library*, to consist of the Librarian, *ex officio*, as Chairman, and four other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management.

See Chap. iv, art. 3; chap. viii, art. 1, 2; chap. x, art. 6.

(vi) *The House Committee*, to consist of four Fellows, who shall have charge of all expenses connected with the House, including the general expenses of the Academy not specifically assigned to the care of other Committees or Officers.

See Chap. iv, art. 1, 3; chap. x, art. 6.

(vii) *The Committee on Meetings*, to consist of the President, the Recording Secretary, and four other Fellows, who shall have charge of plans for meetings of the Academy.

See Chap. iv, art. 3; chap. x, art. 6.

(viii) *The Auditing Committee*, to consist of two Fellows, who shall audit the accounts of the Treasurer, with power to employ an expert and to approve his bill.

See Chap. iv, art. 3; chap. vii, art. 1; chap. x, art. 6.

(ix) *The Committee on Biographical Notices*, to consist of six Fellows, two to be elected each year, six in 1933, one of them to be a Secretary of the Academy, to see that biographical notices of the Fellows are provided.

See Chap. x, art. 7.

ARTICLE 3. The Standing Committees shall report annually to the Council in March on the appropriations severally needed for the ensuing financial year; and all bills incurred on account of these Committees, within the limits of the several appropriations made by the Academy, shall be approved by their respective Chairmen.

In the absence of the Chairman of any Committee, bills may be approved by any member of the Committee whom he shall designate for the purpose.

See Chap. vii, art. 1, 7; chap. x, art. 6.

CHAPTER XII.

MEETINGS, COMMUNICATIONS, AND AMENDMENTS.

ARTICLE 1. There shall be annually eight Stated Meetings of the Academy, namely, on the second Wednesday of October, November, December, January, February, March, April, and May. Only at these meetings, or at adjournments thereof regularly notified, or at Special Meetings called for the purpose, shall appropriations of money be made or amendments of the Statutes or Standing Votes be effected.

The Stated Meeting in May shall be the Annual Meeting of the Corporation.

Special Meetings shall be called by either of the Secretaries at the request of the President, of a Vice-President, of the Council, or of ten Fellows having the right to vote; and notifications thereof shall state the purpose for which the meeting is called.

A meeting for receiving and discussing literary or scientific communications may be held on the fourth Wednesday of each month, excepting July, August, and September; but no business shall be transacted at said meetings.

ARTICLE 2. Twenty-five Fellows having the right to vote shall constitute a quorum for the transaction of business at Stated or Special Meetings. Eighteen Fellows shall be sufficient to constitute a meeting for literary or scientific communications and discussions.

ARTICLE 3. Upon the request of the presiding officer or the Recording Secretary, any motion or resolution offered at any meeting shall be submitted in writing.

ARTICLE 4. No report of any paper presented at a meeting of the Academy shall be published by any Fellow without the consent of the author; and no report shall in any case be published by any Fellow in a newspaper as an account of the proceedings of the Academy without the previous consent and approval of the Council. The Council, in its discretion, by a duly recorded vote, may delegate its authority in this regard to one or more of its members.

ARTICLE 5. No Fellow shall introduce a guest at any meeting of the Academy until after the business has been transacted, and especially until after the result of the balloting upon nominations has been declared.

ARTICLE 6. The Academy shall not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its Publications.

ARTICLE 7. All proposed Amendments of the Statutes shall be referred to a committee, and on its report, at a subsequent Stated Meeting or at a Special Meeting called for the purpose, two-thirds of the ballot cast, and not less than twenty-five, must be affirmative to effect enactment.

ARTICLE 8. Standing Votes may be passed, amended, or rescinded at a Stated Meeting, or at a Special Meeting called for the purpose, by a vote of two-thirds of the members present. They may be suspended by a unanimous vote.

See Chap. ii, art. 5, 8; chap. iii; chap. iv, art. 3, 4, 5; chap. v, art. 1; chap. vi, art. 1, 2; chap. x, art. 8.

STANDING VOTES.

1. Communications of which notice has been given to either of the Secretaries shall take precedence of those not so notified.

2. Fellows may take from the Library six volumes at any one time, and may retain them for three months, and no longer. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

3. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy without the leave of the Librarian.

4. The Council, under such rules respecting nominations as it may prescribe, may elect as Associates of the Academy a limited number of men of mark in affairs or of distinguished service in the community.

Associates shall be entitled to the same privileges as Fellows, but shall not have the right to vote.

The admission fee and annual dues of Associates shall be the same as those of Fellows residing within fifty miles of Boston.

5. Communications offered for publication in the Proceedings or Memoirs of the Academy shall not be accepted for publication before the author shall have informed the Committee on Meetings of his readiness, either himself or through some agent, to use such time as the Committee may assign him at such meeting as may be convenient both to him and to the Committee, for the purpose of presenting to the Academy a general statement of the nature and significance of the results contained in his communication.

RUMFORD PREMIUM.

In conformity with the terms of the gift of Sir Benjamin Thompson, Count Rumford, of a certain Fund to the American Academy of Arts and Sciences, and with a decree of the Supreme Judicial Court of Massachusetts for carrying into effect the general charitable intent and purpose of Count Rumford, as expressed in his letter of gift, the Academy is empowered to make from the income of the Rumford Fund, as it now exists, at any Annual Meeting, an award of a gold and a silver medal, being together of the intrinsic value of three hundred dollars, as a Premium to the author of any important discovery or useful improvement in light or heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American islands; preference always being given to such discoveries as, in the opinion of the Academy, shall tend most to promote the good of mankind; and, if the Academy sees fit, to add to such medals, as a further Premium for such discovery and improvement, a sum of money not exceeding three hundred dollars.

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